June 23, 1947

STEEL

The Magazine of Metalworking and Metalproducing

TECHNOLOGY DEPARTMENT ESTABLISHED 1882

EDITORIAL INDEX, PAGE 63

PORTER DIESEL ELECTRIC Locomotives

For Economical Haulage

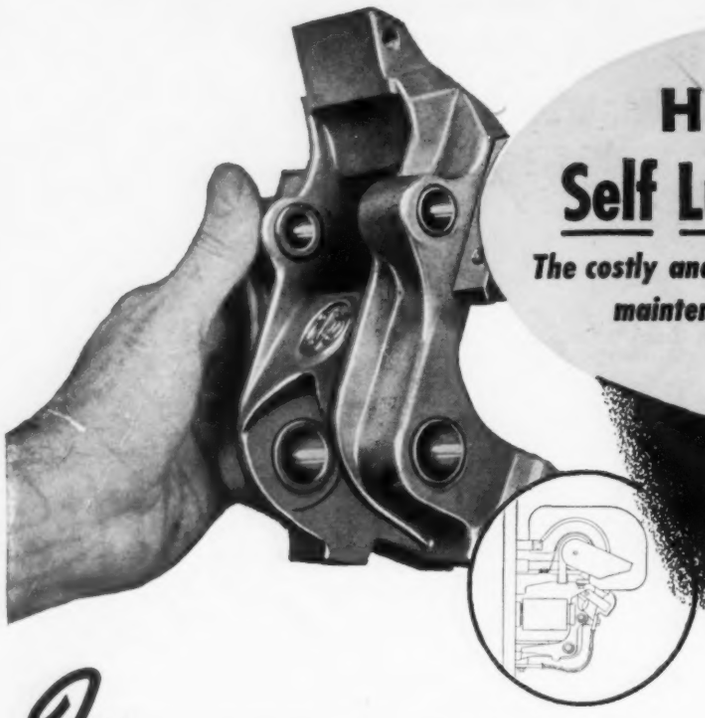
Here's News: The new PORTER Diesel-Electric Locomotives equipped with high-speed Diesel engines give you MORE POWER at LESS COST. This means Lower-Priced Horse Power for industrial switching. Write for details. Our representative will be glad to call and show you how you can cut your switching costs with Porter Diesel-Electrics.

80-Ton, 550 HP, Steel Mill Switcher with Cummins High-Speed Diesel Engine.

PORTER "Better Built" Equipment Established 1866

H. K. PORTER COMPANY, Inc.

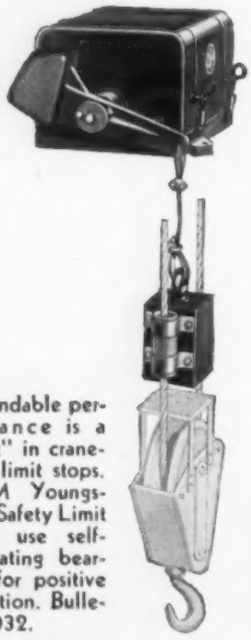
PITTSBURGH 22, PENNSYLVANIA District Offices in Principal Cities



HEAVY-DUTY
Self Lubricating Bearings

The costly and sometimes forgotten item of lubricating maintenance is eliminated forever in this EC&M Equipment

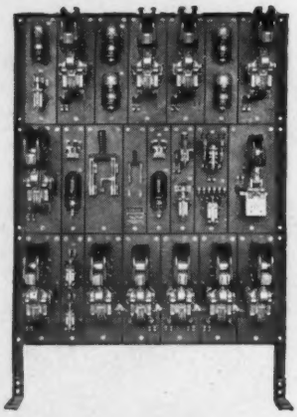
FOR many years, steering-post columns of passenger automobiles have been equipped with self-lubricating bearings for long life and ease of manipulation at any speed. EC&M products have likewise been improved with these modern bearings, eliminating forever the problem of lubrication and resulting in lower maintenance costs and years of dependable performance. Other EC&M products, than those here shown, also use self-lubricating bearings where no leakage can be tolerated and where an oil cushion bearing, causing an oil-film to be generated wherever needed, is an important asset. As a leader in improvements in control design and control apparatus, EC&M was one of the first to use self-lubricating bearings.



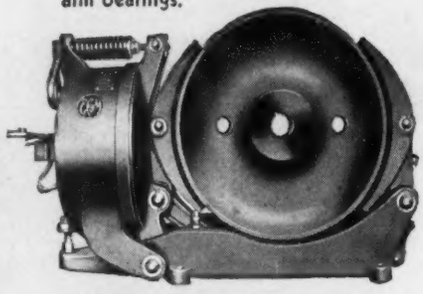
Dependable performance is a "must" in crane-hoist limit stops. EC&M Youngstown Safety Limit Stops use self-lubricating bearings for positive operation. Bulletin 1032.

Lower Maintenance Advantages of these Self Lubricating Bearings

1. Reduced friction.
2. Reduced inspection time.
3. Ever-present oil film insuring freedom of rotation throughout long life.
4. Exceptionally pure bearing materials.
5. High factor of safety.
6. Close tolerances through high quality.
7. Strong hydraulic cushion formed by tiny pores filled with liquid lubricant.



All LINE-ARC Contactors on EC&M A-c and D-c Starters and Controllers use self-lubricating bearings on main and auxiliary arm bearings.



An ever-present oil film on the bearings of all large sizes of WB Brakes permits quick movements due to minimum friction. Bulletin 1004.

Cam Master Switches are equipped throughout with self-lubricating bearings. Bulletin 1190.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 East 79th Street • Cleveland 4, Ohio

Steel Sheets

For Frozen-Food Cabinets

. . . or Modern Kitchen Ranges

Freezer units and kitchen ranges are only two of the highly-important domestic products being made better with Bethlehem Steel Sheets.

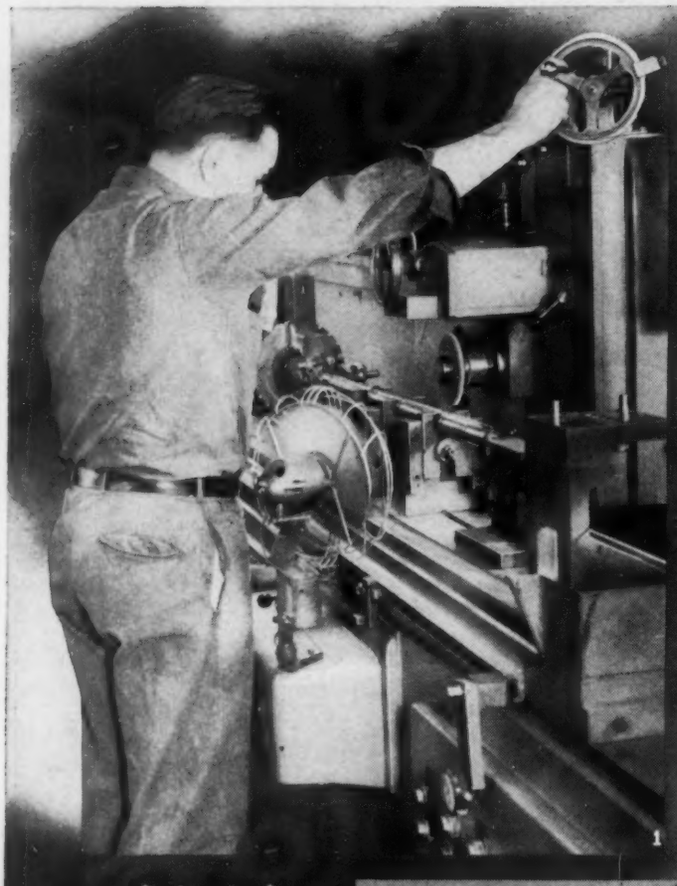
These and scores of other items including refrigerators, washing machines, water heaters, sink cabinets, lockers, furniture and automobiles are easier to mass-produce because of the uniform working properties of Bethlehem sheets.

Bethlehem cold-rolled and Bethlehem hot-rolled sheets are processed in high-speed continuous mills. Their gage, surface, drawing and forming qualities are carefully controlled and rigidly inspected to meet manufacturers' requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Bethlehem Steel Sheets ★ BETHLEHEM STEEL ★



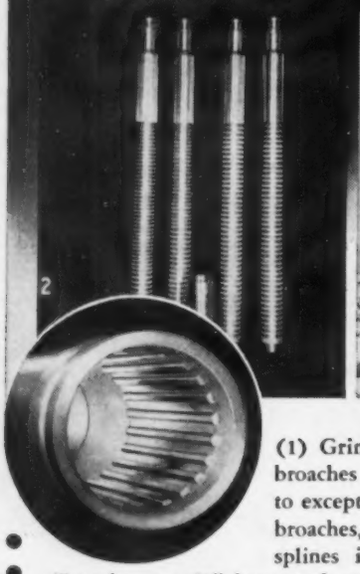
FOR BROACHES

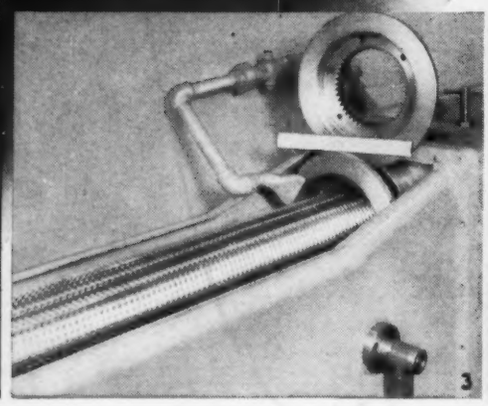
and for ALL Your Broaching Needs

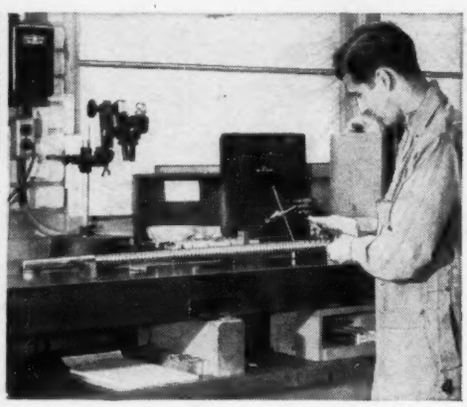
SEE *American* FIRST

You are sure of greater satisfaction when you buy broaches from *American*. This is because of *American's* broad experience in all phases of broaching—machines, tools, fixtures, and engineering. This all around experience assures you of broaching tools that will give exceptionally long life at low initial cost.

See *American* first for all types of broaches: surface, round, spline, serration, hex, square, and formed broaches in any required size. *American* also manufactures pull and push heads for broaching tools of all sizes. And see *American* first for *everything* in broaching—machines, tools, fixtures, and engineering.







(1) Grinding a spline broach. All *American* broaches are ground by skilled broach makers to exceptionally close tolerances. (2) These four broaches, used in succession, cut 24 angular splines in steel airplane landing gear struts. Broaches are 65" long, and cut a spline section 12⅛" long by 4¼" I.D. Inset shows broached interior of part. *American* manufactures broaches of every size and variety, for the metal working industries. (3) This large broach, in a standard *American* H-30-72 Horizontal Broaching Machine, cuts 46 involute spline teeth in a bevel gear part. Size of broach is indicated by 12" rule shown with broached gear part placed on top of machine. (4) Checking a spline broach for spline width in *American's* Broach Inspection Department. Every broach must pass rigid inspection before shipment.

WRITE FOR CATALOG NO. 144

Contains complete description of different types of broaches and machines. Tells uses of each. Gives information on care and maintenance of broaches, specifications of standard broaches, and other useful facts. No obligation. Write for your copy today!

MEMBER BROACHING TOOL INSTITUTE

American BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

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BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS U.S.A.

Girds for a rough trip

Packed is the word to describe how Jack & Heintz fractional horsepower motors are prepared for shipment. Each size motor has its own heavy corrugated container into which it slips snugly. Then it is *braced three ways* by tight-fitting corrugated forms which prevent shifting or turning of the motor. Result: Added assurance that Jack & Heintz motors reach their destination in perfect shape.

Extra values through

JACK & HEINTZ

Mass Precision

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Behind the Scenes...

High Title, Low Status

Commenting on the item about second vice-president, Colin Carmichael of MACHINE DESIGN editorial staff says the most complicated hierarchies of officials are on ships of the Cunard line. At one point he was affiliated with that organization with the title of "First Senior Eighth Engineer", which sounds like something important but which really meant he was No. 39 in a list of 39 engineer officers, which started with Chief, Staff Chief, First Senior Second, Second Senior Second, Third Senior Second, First Junior Second, Second Junior Second, Third Junior Second, First Senior Third, etc., etc., all the way down to Brother Carmichael at the bottom!

Detroit Communique

Dear Shrdlu:

We were one of the fortunate 200 passengers, culled from the elite of press and radio reps throughout Michigan aboard General Motors' sleek new astradomed diesel-electric streamliner, the *Train of Tomorrow*, on its maiden run into Detroit. As an old railroad fan, I can tell you it is really something.

The doings began at noon, June 3, at Detroit's Fort Shelby hotel, where the crowd gathered for a nifty lunch of fruit cocktail—baked beans—ham—roast beef—salad—creamed potatoes—rolls—coffee—apple pie; then piled into a fleet of new GM Silversides buses to be whisked to Lansing where the *Train of Tomorrow* was panting on a siding, anxious to be off.

It happened to be the one day this spring it has not rained in Michigan, so the journey was made in a burst of brilliant sunshine, a fitting tribute to the handsome creation of GM stylists and engineers of the Electromotive Division and Pullman-Standard Mfg. Co. The experimental million-dollar train, strictly not for sale, comprises a standard 2000-horsepower diesel locomotive and four cars, the like of which has never been seen on any chemin de fer.

All feature the central greenhouse effect which GM calls an Astra-Dome, a glassed-in enclosure protruding from the car roof about 18 inches and seating a score or more of passengers who can get a perfect view of the surrounding scenery in all directions. The glass is a double layer of heat-tempered safety plate which gives protection from both the heat of the sun and impact of stray objects such as pigeons, errant robins and cinders.

The glass was given its first test by a small boy standing along the track near the station at Pontiac. He picked up a medium-size rock, aimed carefully, and neatly popped the forward window in the astra-dome of the first car. The angle must have been just right for it cracked the outer pane of glass, otherwise doing no damage.

Some of the newspaper wags aboard immediately started figuring out news story leads to the effect the streamliner on its first trip was "kicked in the astra-dome," but they were ultimately blue-penciled.

Each car is built on three-levels—the astra-dome, reached by a winding stairway; the regular car floor level, and a third lower level only about 8 or 10 inches above the rails. Included in the four cars is every type of accommodation from observation and lounge to roomettes, drawing rooms, sunken bars, electric kitchen, intercommunication systems, train-to-town radio and telephone service and dozens of others, including some neat suspension and journal bearing systems on the undercarriages of the cars.

General Motors is about to take the train on a tour of the country and stops will be made in most large cities. The idea is to show the public the many innovations possible in design and construction of railroad equipment, both from mechanical and esthetic standpoints, and perhaps incidentally to persuade some railroad president he should buy a few new trains of this type. GM has no copyright on any of the ideas embodied in the *Train of Tomorrow;* anyone is free to make use of them, and we have a hunch soon will.

An amazing thing on the christening run, to this observer, was the literally thousands of people lining the tracks at every way station to get a glimpse of the strikingly different train. There were old men and women, hundreds of small fry, babes in arms, not to mention many railroad workmen who were trying hard to look bored but not having much success.

By all means when the *Train of Tomorrow* pulls up on a siding in your city, have a careful look. You will be amazed at what can be done within the limited confines of the average-size railroad passenger car, and with no sacrifice, rather a gain, in the number of persons who can be accommodated.

Yrs. rspfly.,
Art Allen

That's all for today, Kiddies!

Shrdlu

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STEEL
Vol. 120—No. 25 June 23, 1947

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Editorial Staff on Contents Page

Now Available at No Extra Cost!

DENISON'S UNIQUE *Multi-Speed Control*

FOR ADDED *MULTIPRESS* VERSATILITY

GREATLY increased Multipress adaptability is now yours—without one penny of extra cost to you! The new Multi-Speed control feature is now a standard part of all basic Multipress units, adding new versatility once available only on higher priced models. All the production-boosting features of the Multipress are still present, with many added improvements.

Ram stroke, pressure and speed are under constant control of the operator. Pressure can be increased or decreased while the ram is on the work. Ram speed can be varied at any point in the downward travel of the ram to the work. This advantage permits the ram to approach the work at high speed while its pressing speed can be regulated. Adjustable features permit close limitation of upward and downward ram travel.

Denison now has a colorful 28-page booklet "Multipress, And How You Can Use It." You'll find its pages packed with helpful information about Multipress and how it has solved production problems in almost every industry—plus complete information on the Multi-Speed control. Write for your copy today, and learn why Multipress is the proven answer to hundreds of needs for increased production.

THE DENISON ENGINEERING COMPANY

1163 Dublin Rd., Columbus 16, Ohio

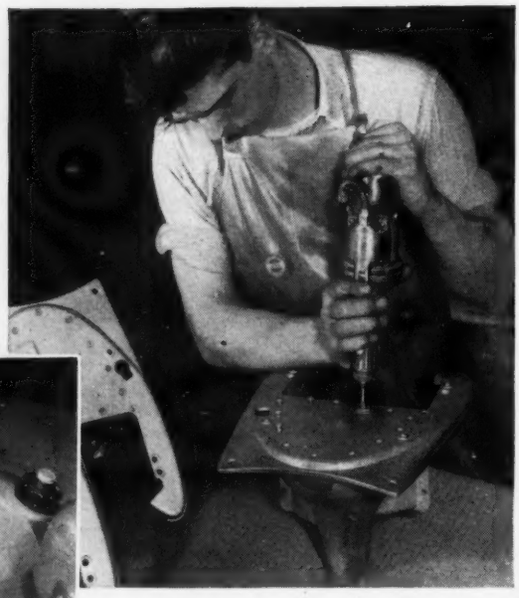
HydrOILics — INDUSTRY'S RIGHT HAND

DENISON EQUIPMENT *in* APPLIED HydrOILics

"Drive Faster... set up solid, without burrs" says EVINRUDE

NO WOBBLY STARTS *and slow driving to avoid skids here. Phillips Screws go in fast, set up tight and flush to hold cover of water jacket.*

DRIVING TIME CUT 30% *in fastening base plate to muffler assembly with Phillips Screws. Power driver centers and stays in recess — no slips.*



TIGHT FASTENING *is essential in joining the two parts of die cast fuel tank, so Evinrude depends on Phillips Screws. Photo shows use of Phillips Screws for attaching nameplate where skids would mean expensive refinishing.*

★ ★ ★

... Key points of another study of assembly savings made with Phillips Screws in leading plants; from report of James O. Peck Co. independent investigator.

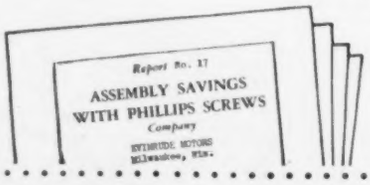
"Obvious assembly savings prompted our use of Phillips Head Screws in the 'Zephyr' Outboard Motor," explained Evinrude's Works Manager, "and results are even better than expected."

"Phillips Screws make the most of power tool speed. No lost motion as when driving slotted screws. We just bring the driver bit down and it automatically centers and seats in the Phillips Recess. That makes for a very fast operation ... and an economical assembly. Also, we avoid driver skids, and subsequent expensive refinishing.

"We have to set 'em up solid, and the Phillips Recessed Head can take the necessary torque without breaking or burring. Outboards often get rough usage, and Phillips Screw fastenings match the sturdiness of the overall construction.

"Dangerous burrs avoided. Workmen can get bad cuts on hands and arms from sharp burrs common to slotted screws. With Phillips Screws, that hazard is banished, and the burr-free, ornamental recess has a much more shipshape appearance.

You'll find good ideas for your assembly operations in the complete report of this and other assembly studies ... on metal, wood, and plastic products. Inside facts on modern methods of America's best assembly engineers. FREE — use coupon.



Phillips Screw Mfrs., c/o Horton-Noyes
1800 Industrial Trust Bldg.,
Providence, R. I. S-18

Send me reports on **Assembly Savings with Phillips Screws.**

Name .....

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PHILLIPS *Recessed Head* SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

23 SOURCES

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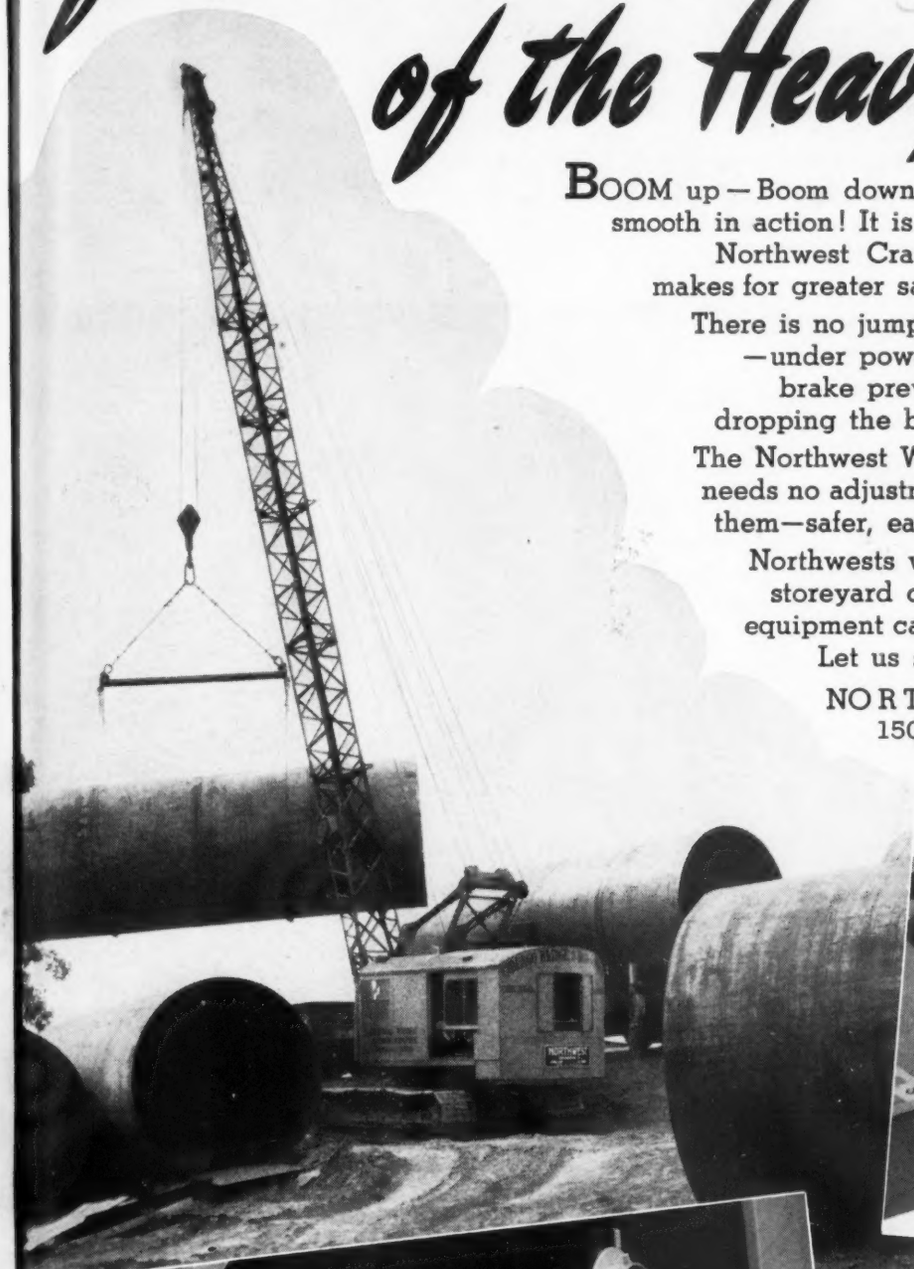
for SMOOTHER HANDLING of the Heavy Loads!



BOOM up—Boom down! The Northwest Worm Boom Hoist is smooth in action! It is typical of the better construction of Northwest Crawler Cranes—a fool-proof feature that makes for greater safety in spotting and handling loads.

There is no jumping, no chattering—just velvet action—under power both *up* and *down!* An automatic brake prevents running down the worm and dropping the boom.

The Northwest Worm Boom Hoist is fully enclosed and needs no adjustment. That's the way Northwest builds them—safer, easier to care for, less costly to operate.

Northwests will cut your material handling and storeyard costs. They do things no other type of equipment can do. There is a size for every problem. Let us send you complete details.

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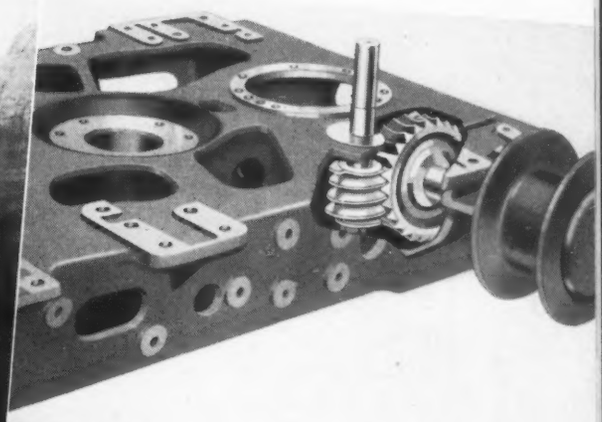
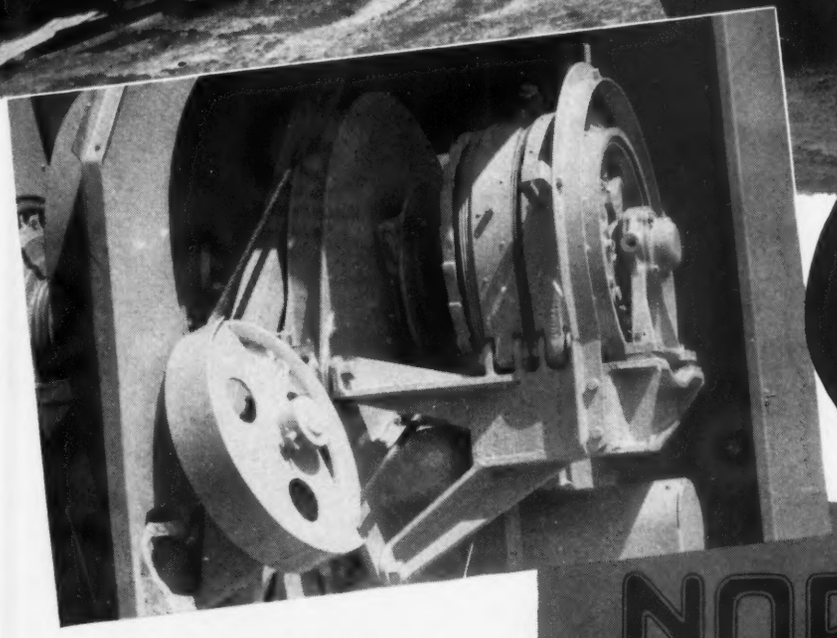


Northwest Worm Boom Hoist



Independent High Speed Boom Hoist provides live boom action independent of all other operations.

4 to 44 tons

NORTHWEST

The Crane that goes Anywhere!

Even on today's toughest Steels CSM's give you Astounding

Slot in S.A.E. 3145 Forging Milled in one pass — metal removal: 21.8 cu. in. per minute!

WORKPIECE: Connecting link used in mining machinery

MATERIAL: S.A.E. 3145 Forging

HARDNESS: 190-200 Bhn

OPERATION: Mill slot 1 15/64" wide x 2¼" deep*

CUTTER: 10" diam. carbide (Lovejoy Slotting)

SPEED: 117 rpm (306 SFM)

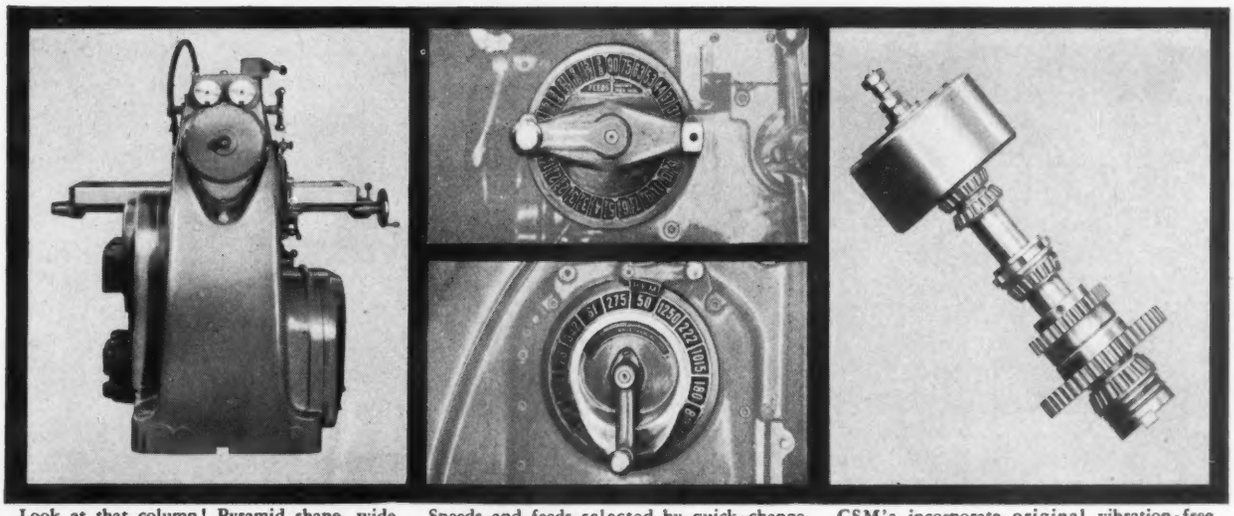
FEED: 7.75 ipm (.0065" per tooth)

RATE OF METAL REMOVAL: 21.8 cu. in. per minute

*Milled in single pass from solid metal section.

Kearney & Trecker super-power new rates of metal removal!

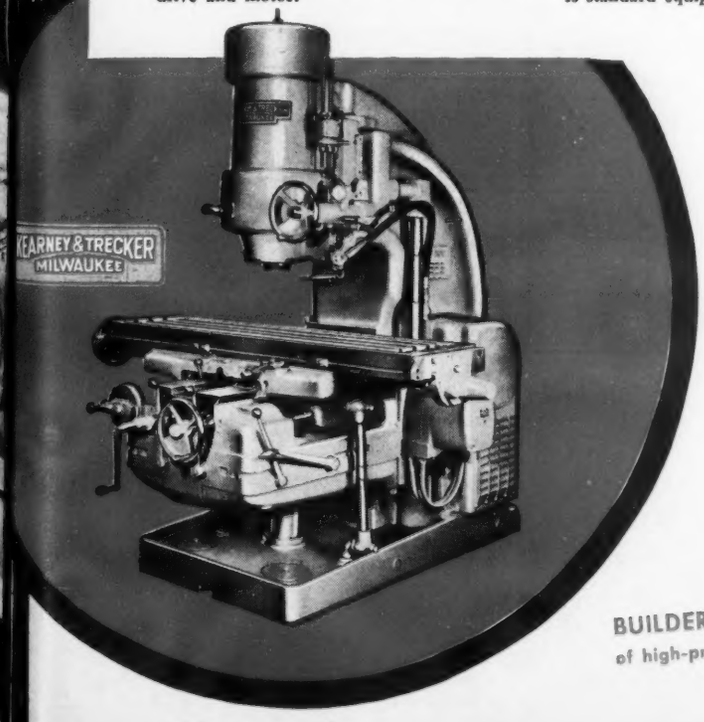
These new super-power Kearney & Trecker CSM's use carbide cutters to fullest efficiency —set amazing new high standards of ferrous and non-ferrous metal removal.



Look at that column! Pyramid shape, wide base, solid back, box-type ribbing give you maximum rigidity and vibration-free operation. That means high metal removal rates, accuracy, long tool life. Design saves floor space by total enclosure of powerful spindle drive and motor.

Speeds and feeds selected by quick-change dials. Choice of 16 spindle speeds mean right cutter speed for use on almost any material. 32 feeds to table and knee mean right feed per cutter tooth, a key factor in using carbides to best advantage. Separate feed motor is standard equipment.

CSM's incorporate original vibration-free three-bearing spindle design. Flywheel, now an integral part of spindle, insures constantly smooth flow of power to cutter. Electrical controls for acceleration and deceleration of gear train are part of basic design. Control interlocks protect operator, cutter and workpiece.



IMPORTANT NOTICE!

Because CSM's are different from any other milling machines — only a check of your production by an experienced Kearney & Trecker engineer, trained in the use of CSM's, can show you the tremendous savings possible. CSM's are made in Plain and Vertical types with 20, 30, and 50 hp. For an on-the-spot personal analysis of how CSM's can increase your production, *wire us collect.* There is no obligation.

KEARNEY & TRECKER CORPORATION

MILWAUKEE 14, WISCONSIN

4710

BUILDERS OF 97 DIFFERENT MODELS AND SIZES

of high-production precision milling machines — power rated for every job.

SURE OF YOUR FORGINGS? BLOOMS? CASTINGS?

Allis-Chalmers *New* Betatron Equips Plants for 100% Inspection of Output—X-Rays 4 to 24 inch Steel Sections in *Minutes!* Detects Flaws 2 mils wide, 1/32 inch deep—Checks Welds . . . Mechanism Clearances—Is Simple to Operate!

QUANTITY WITH GUARANTEED QUALITY—in iron, steel, and foundry work, production-line x-raying means just that! It is a *positive* aid in non-destructive testing of large blooms and billets for forgings and castings. Important applications are heavy machinery parts and assemblies, as for automobiles, tractors and trucks. The betatron will detect broken or misaligned parts in complete engine assemblies.

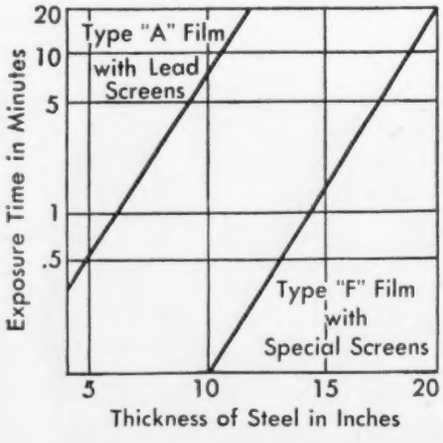
No Time Wasted Working Faulty Material!
The "A-C" 22-million volt betatron enables faster x-raying of thick metal sections. Rapid flaw detection saves time and money and insures uniform product quality.

Has Simple Panel Control
The Allis-Chalmers 22-MV betatron is easily operated, requires little maintenance, and has low power consumption—about 30 KW during exposures. Standard industrial films are used; enlargements can be made directly.

Backed By "A-C"s 100-Year Reputation
"A-C"s vast facilities plus 50 years of transformer experience and the inventive engineering of a staff of highly skilled technical men in betatron development from the first, have gone into the building of this valuable industrial tool. Technical information on request. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2271

BASICALLY A TRANSFORMER,
the betatron has a magnetic core, wound primary, and a donut-shaped evacuated chamber secondary in which electrons emitted from a filament travel in a circular path until nearly attaining the speed of light. They are then deflected from the circular orbit and strike a platinum target generating high frequency x-rays. Rays emerge in cone-shaped beam with focal point smaller than the head of a pin.



X-RAY EXPOSURE CHART
shows time required for x-raying various thicknesses of steel for the two most commonly used film types. This chart was plotted for a target-to-film distance of four feet.

Transformers

Switchgear and Switchboards

Rectifiers

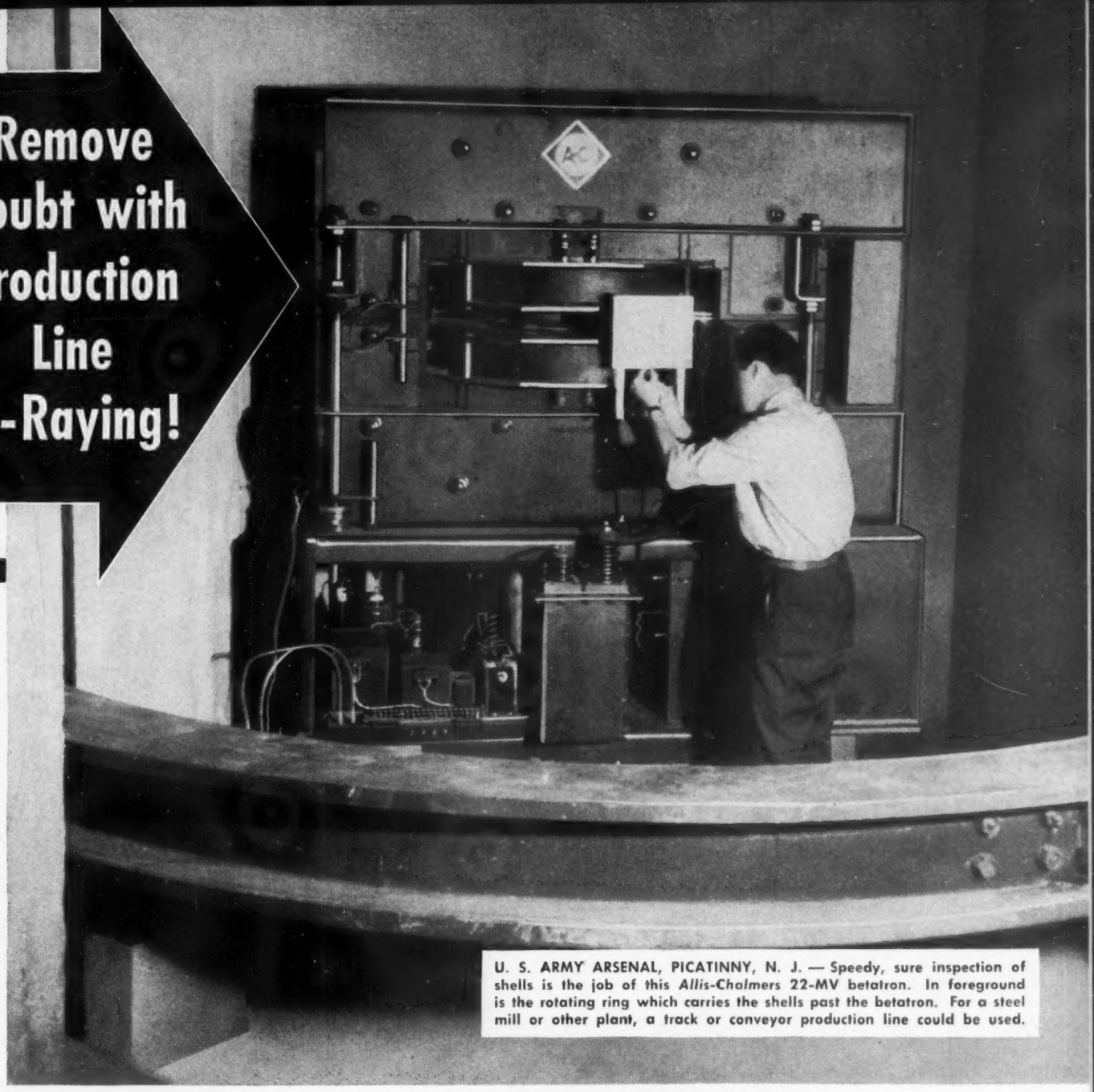
Motors for Mill Drives

ALLIS

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

One of the Big 3 in Electric Power Equipment—

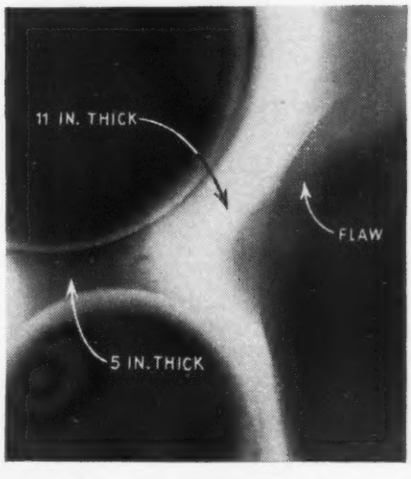
Remove Doubt with Production Line X-Raying!



U. S. ARMY ARSENAL, PICATINNY, N. J. — Speedy, sure inspection of shells is the job of this *Allis-Chalmers* 22-MV betatron. In foreground is the rotating ring which carries the shells past the betatron. For a steel mill or other plant, a track or conveyor production line could be used.

SIMPLE PANEL CONTROL

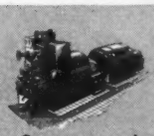
reduces betatron operation to three steps. Also, the "A-C" 22-MV betatron automatically shuts off at the end of the predetermined exposure. Highly skilled technicians are not required . . . betatron x-raying requires a minimum of training of operating personnel.



BETATRON REVEALS FLAWS

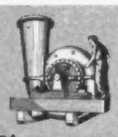
saving money and time in machining. One radiograph enables several thicknesses of the same piece to be studied. This reproduction of an actual x-ray shows a defect in a steel forging that could ordinarily be detected only after long exposure with regular x-ray equipment or by expensive machining and testing.

CHALMERS



Steam and Hydraulic Turbines

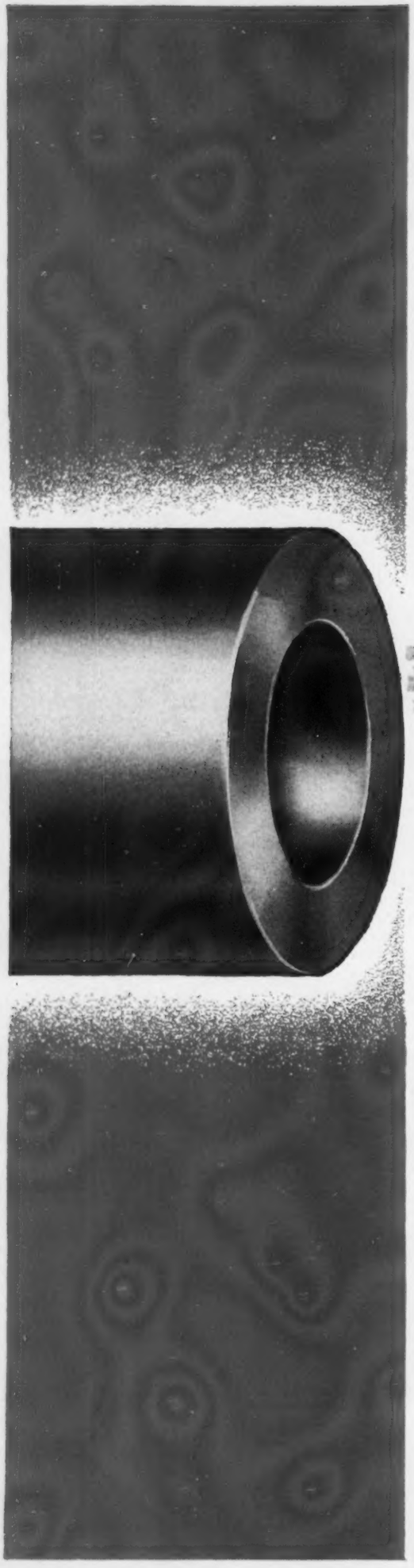
Centrifugal Pumps



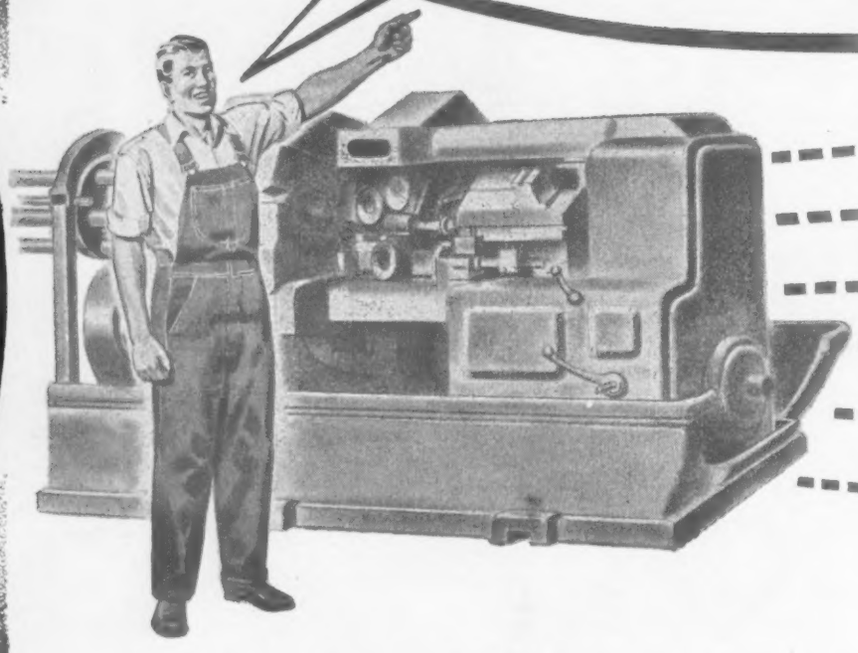
Blowers and Compressors

Texrope V-Belt Drives

Biggest of All in Range of Industrial Products



THEY COME 60% TO 100% Rockrite

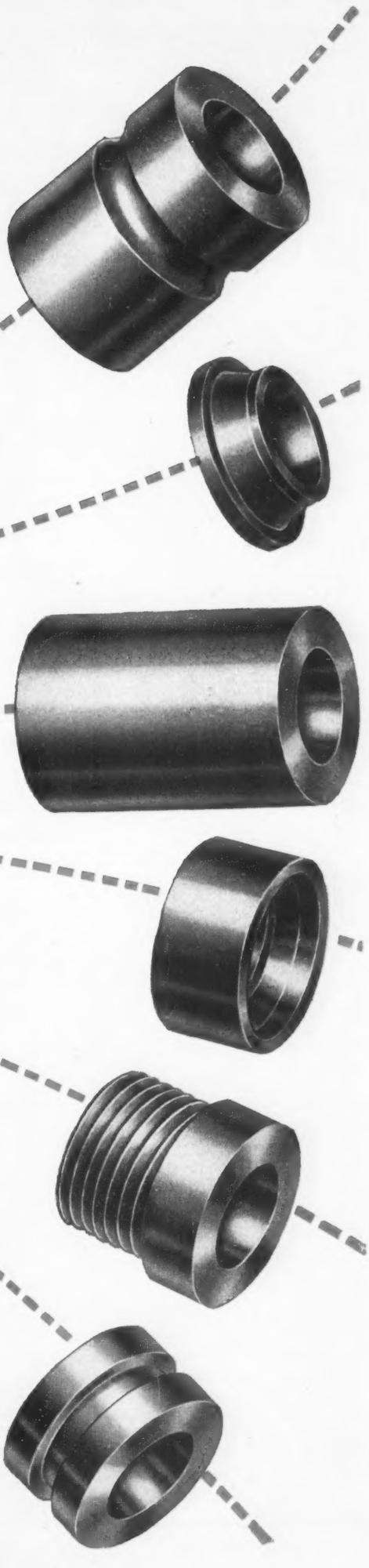


New, even startling, possibilities in screw-machine output of cylindrical and ring-shaped parts have been opened up through the use of Rockrite Tubing. In one case, two parts were finished simultaneously from Rockrite Tubing whereas only one could be made at a time from ordinary mechanical tubing. The output of parts per machine hour in other cases has been raised 60 per cent . . . even 100 per cent.

Rockrite Close Tolerance Tubing is more concentric than commercial tubing, has less variation in wall thickness, and is sized to closer outside- and inside-diameter tolerances. Lighter, faster, more uniform cuts are made possible, permitting practical use of forming tools with longer tool life, and other advantages.

In many instances slow boring can be eliminated as a bottle-neck to production. Fewer machining operations are required, and frequently stations can be released for added operations.

OUT FASTER FROM TUBING



Rockrite Tubing is available in a variety of metals, and also as bi-metal tubing, long-piece tubing, and tapered tubes.

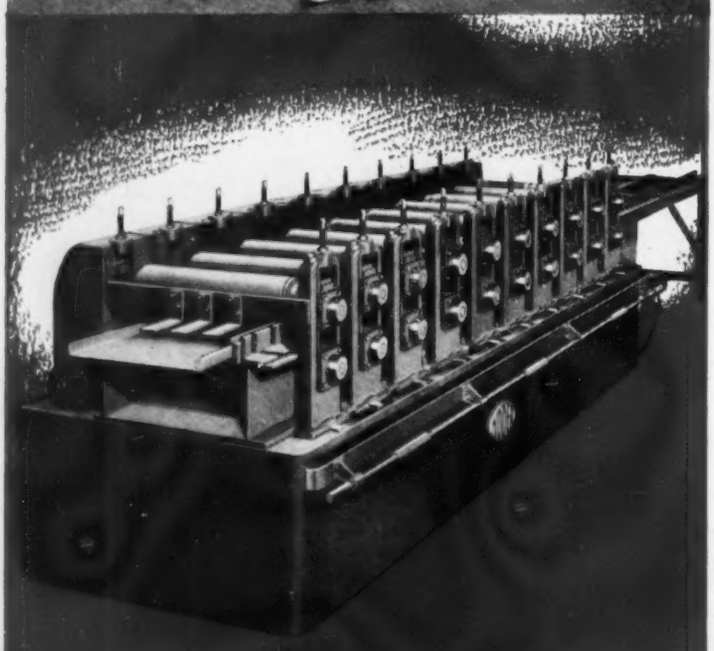
Production shop executives will find in Rockrite's 20-page booklet many valuable, tested ideas which can apply specifically in their own plants. Write today for your copy. Ask for booklet, "Rockrite Close Tolerance Tubing." There is no obligation.

TUBE REDUCING CORPORATION

WALLINGTON
NEW JERSEY

Seven Big Advantages of COLD-ROLL-FORMED Shapes

STRUCTURALS • PANELS • TUBING • MOULDINGS • TRIM



SERIES OF SEVEN

No. 3

Fine Surface Finish

Sheets and strip, for cold-roll-forming purposes, is readily obtainable, pickled or cold rolled, affording a fine, smooth surface, free from rust, scale, roughness and sharp corners, and therefore admirably adapted for modern fabricating purposes.

This and six other factors, equally important, (all explained in Yoder Bulletin No. 101), make it clear why cold-roll-formed structural shapes are finding ever widening uses in American industry. Ships, railroad coaches, airplanes, automobiles, trucks, furniture and fixtures, steel buildings, refrigerators—these are just a few out of hundreds of uses.

In many cases, where slitting, coiling, embossing, curving, welding and other operations are also necessary, they may be done on standard Yoder-built accessory equipment, installed with a Yoder Forming Mill, at a great saving in unit cost.

If you suspect that somewhere in your plants a Yoder production line might take the place of older and slower methods, the services of Yoder engineers are at your disposal in finding the right answer. Remember, you incur no obligation by consulting us.

Yoder Bulletin No. 101 contains illustrations, facts, and figures on cold-roll-formed products and the machines for making them.

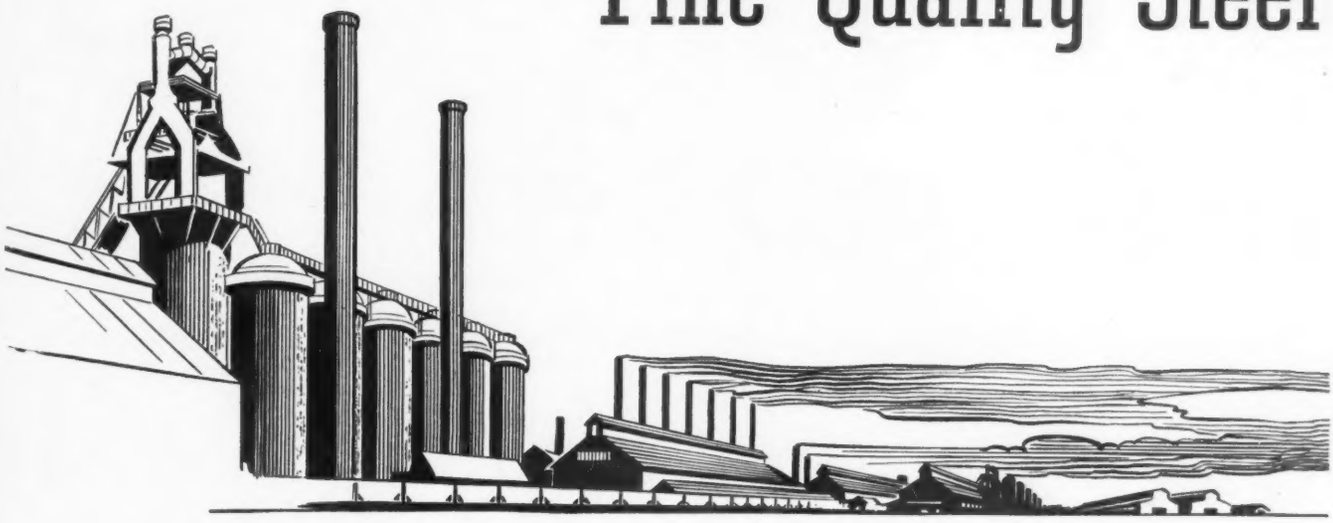
THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING

ROLL FORMING AND TUBE MILL MACHINERY

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSSING • CURVING • WELDING • CUTTING-OFF

Serving the Middle West and the Nation with Fine Quality Steel



Since 1878, Granite City Steel Company has maintained facilities large enough to permit the use of the latest processes developed by the steel industry... yet small enough to permit the scrupulous attention to manufacturing detail that is necessary to produce steel of the finest quality.

And, since 1878, the manufacturers of the Nation and the Middle West have specified "Steel from Granite City" when they need fine quality steel tailor-made to their own particular specifications. They know that steel from Granite City is finer quality steel.

Granite City Steel Company

GRANITE CITY, ILLINOIS

Chicago • Cleveland
Houston • Indianapolis
Kansas City • Los Angeles

SINCE GRANITE CITY STEEL 1878

Milwaukee • Memphis
Minneapolis • Moline
New York • St. Louis

HOT ROLLED SHEETS • COLD ROLLED SHEETS • STRIPLATES • STAINLESS-CLAD • TIN PLATE
TERNE PLATE • ELECTRICAL SHEETS • TIN MILL PRODUCTS • PORCELAIN ENAMELING SHEETS

INTO THESE COILS . . .
are blended the care of our metallurgists and chemists, the planning of our production men, the sweat of our many skilled workers . . . all working together for just one thing . . . to make sure that when our product becomes part of your product, it will give you exceptional performance.

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Coming

THE GREATEST INDUSTRIAL SHOW ON EARTH

SEPT. 17-26

Machine Tool Show

AT THE DODGE-CHICAGO PLANT

Make your plans now to be there. Attend the first Machine Tool Show that has been held in twelve years. There will be 12 acres of exhibits in the Dodge-Chicago Plant (now the Tucker Corporation Plant), where the engines for the B-29's were formerly made. It's the BIG show for the entire metalworking industry. Nowhere else in America is there sufficient floor space to display, under one roof, all of the exhibits of the 1947 Machine Tool Show.

INDUSTRIAL LEADERS AND PLANT OPERATORS FROM ALL OVER THE WORLD

More than 100,000 management, production, engineering, purchasing and financial executives from all over the world are going to be there. You'll find the answers to some of your present and future problems at the Machine Tool Show. You can't afford to miss it.

TOOLS NEVER BEFORE EXHIBITED

The latest equipment and newest developments will be here, ready for your inspection. The products of over 250 manufacturers—more than 1,000 new machine tools, forging machines and other metalworking machinery and equipment, of all sizes and types, will be in full operation.

TECHNICAL DEVELOPMENTS AND FUTURES

In addition to the exhibits, the Machine Tool Congress will hold nightly sessions devoted to the presentation of papers, by recognized authorities, covering outstanding new developments in metalworking techniques and processes. All who attend the Show may attend the Congress. Your badge is your admission.

WRITE FOR COMPLETE INFORMATION

Make your plans now, to attend. Send in your advance registration today. If you have not already received your copy, ask for the booklet containing information about hotel reservations, transportation from downtown Chicago to the show, etc.

AVOID DELAY AT THE GATE

Send in an advance registration blank now. Your official registration will then be completed and mailed to you, and becomes your admission to the show.

MAIL YOUR ADVANCE REGISTRATION TO:

National Machine Tool Builders' Association
10525 Carnegie Avenue, Cleveland 6, Ohio

ADVANCE REGISTRATION

Name _____
(Please Print)
Title or Position _____
Company _____
Address (in full) _____

The Registration Fee is $1.00. Checks should be made payable to the Machine Tool Show

SEPT. (√)	Please Check Dates Of Attendance
17	
18	
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Closed Sunday	
22	
23	
24	
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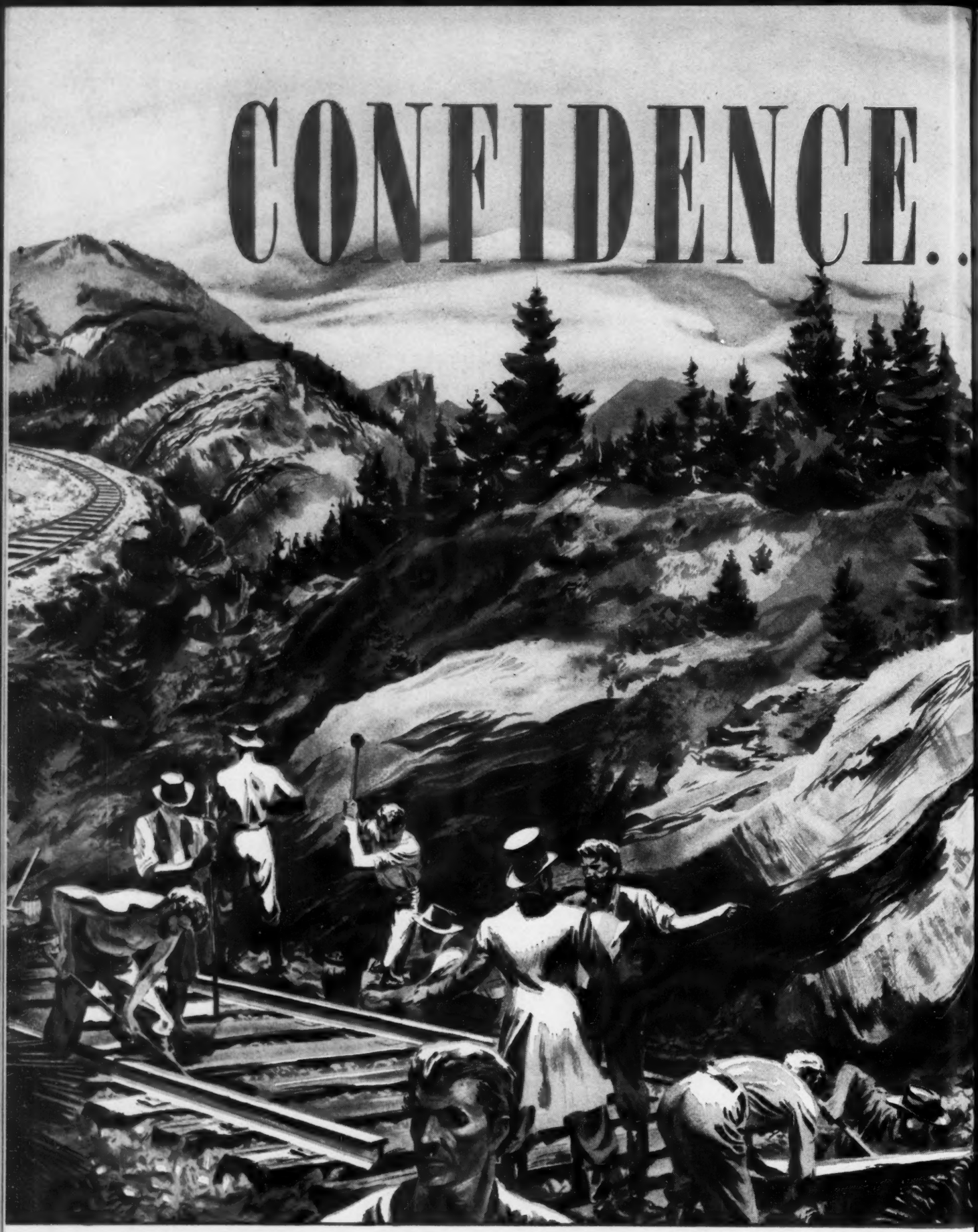
26	

CONFIDENCE...



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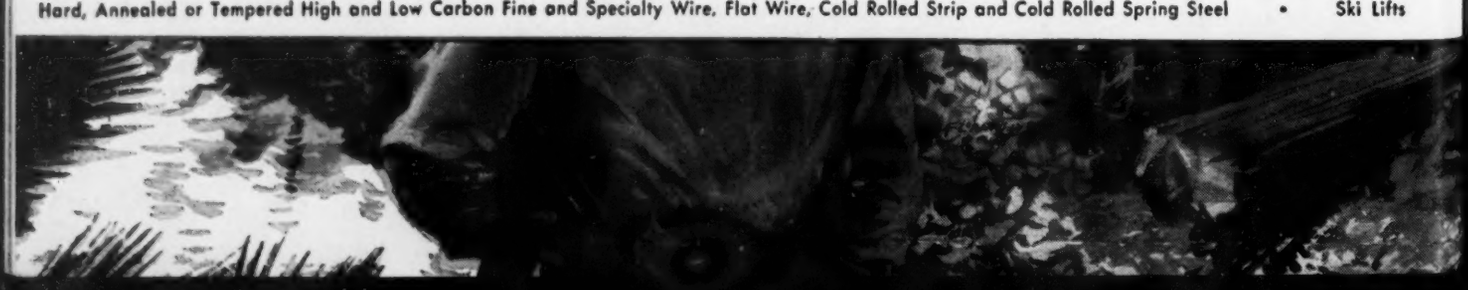

. . . . . how much is it worth?

IN 1846, twenty three years before the Golden Spike was driven at Ogden, Utah marking the completion of the first transcontinental railway, John August Roebling built America's first truly practical, wire rope suspension bridge. This bridge, which carried traffic across the Monongahela River for scores of years, stood as a silent testimonial to his confidence in a principle of bridge building which, in that day, was looked upon with considerable misgiving.

How much is this confidence worth to bridge engineers, and to humanity as a whole, today?

Had it not been for his confidence there would have been no Brooklyn, George Washington nor Golden Gate Bridges. Had it not been for your confidence in the company that bears this pioneer's name, there could have been no John A. Roebling's Sons Company.

Your confidence is valued above all of this company's assets. Every Roebling employee's job depends upon his ability to preserve that confidence by producing better products and by giving you better service than you can find elsewhere.

Any product is only as good as the organization that makes it.

FOR SOMETHING "SPECIAL", SPECIFY ROEBLING WIRE

IT MAY BE a new application for wire . . . or specifications calling for a unique combination of wire qualities. Whatever it is, if you're looking for something "special" in wire, call on Roebling.

Many a new product owes its success to the right wire—made especially for the purpose by Roebling. And it's natural that designers as well as manufacturers think of quality wire as synonymous with Roebling. A pacemaker in wire products for over a century, Roebling has the craftsmen and equipment, the research and engineering facilities, to tackle practically *any* wire problem.

Your Roebling Field Engineer, equipped by training and wide experience, can offer many valuable suggestions on production short-cuts and savings even in the early stages of the development of your new product. He'll gladly consult with you. Call him at our nearest branch office.

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ROEBLING

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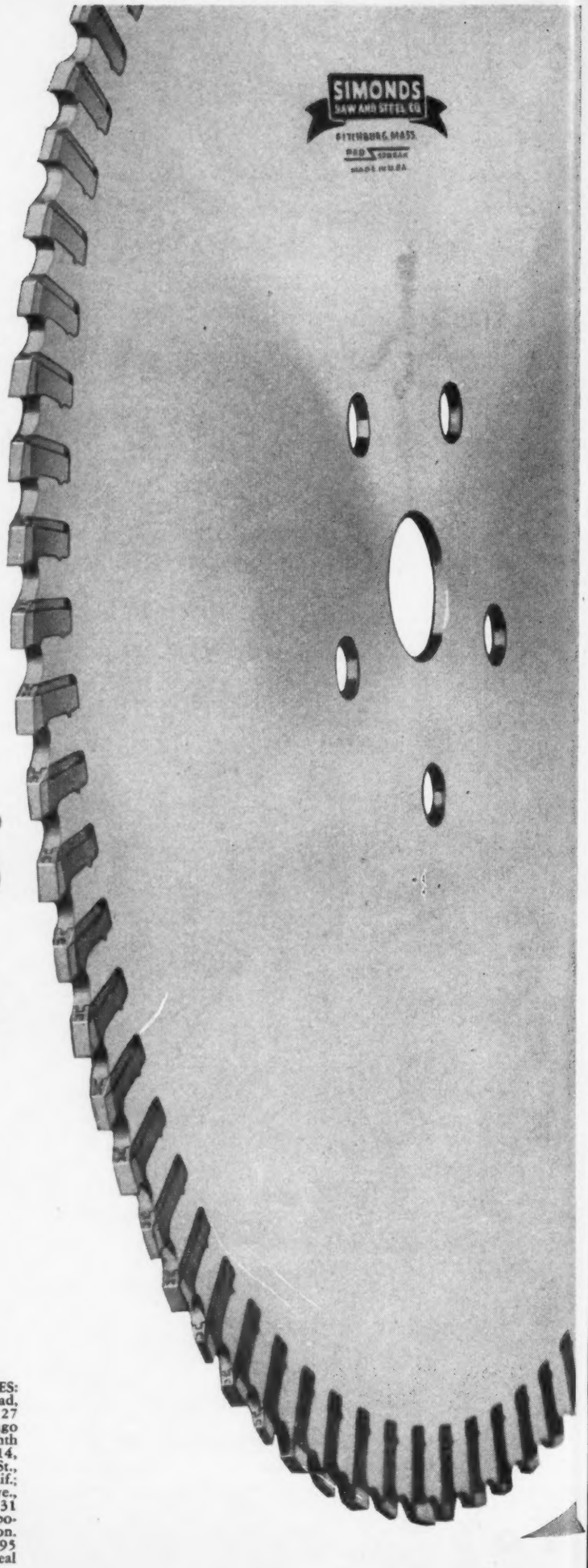
. . . the Original Saws with the
CURVED-GULLET TEETH
that permit Faster Speeds
and Feeds . . . Deeper Cuts



SIMONDS

Inserted-Tooth METAL-CUTTING Saws

Curved-gullet design . . . together with alternating square and bevel teeth . . . prevents welding of chips to the saw-plate. Each tooth is held in place by its own separate wedge, which gives extra strength to the saw. And Simonds' own special high-speed steel gives greater speed, feed, and depth of cut. So for uninterrupted operation, get Simonds I. T. Metal Saws from your Industrial Supply Distributor, or from the nearest Simonds office.

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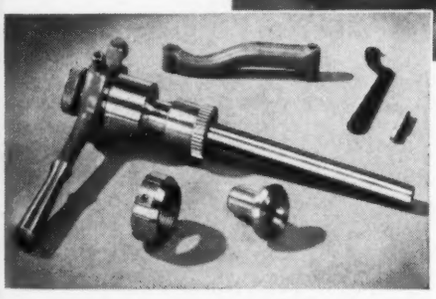
14-1/2" x 5' South Bend Quick Change Gear Lathe. Price, less electrical equipment and chip pan, f. o. b. factory,
$1309.00



BROADEN THE SCOPE OF YOUR LATHES
South Bend Attachments and Accessories simplify and speed tooling, often save delay and expense of making special fixtures. Shown above is the Handlever Draw-in Collet Attachment. Write for illustrated Catalog No. 77 which shows all South Bend Attachments and Accessories.

South Bend Lathes are engineered to meet exacting needs for precision accuracy in all types of industries, and to maintain their accuracy year after year, even under strenuous production conditions. Accuracy and long life are built into South Bend Lathes as carefully and surely as they are built into fine timepieces. Correct design based on nearly forty years of research and experience, quality materials specially selected for specific needs, expert craftsmanship, strict inspection through all phases of production and assembly, and thorough testing to rigid working tolerances before shipment, guarantee dependable performance in laboratory, toolroom, production shop, and maintenance department.

South Bend Quick Change Gear Lathes and Toolroom Lathes are made with 9", 10", 13", 14½", and 16" swings, and bed lengths to 12'. Turret Lathes are made with collet capacities to 1". Write today for free 68-page catalog No. 100-F which illustrates all sizes and models, gives detailed specifications, and shows all attachments and accessories.

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Specify MO-MAX HIGH SPEED STEELS *for your...*

MILLING CUTTERS

Only MO-MAX GIVES YOU *ALL* THESE ADVANTAGES

1. MO-MAX has superior cutting qualities.
2. The machinability of MO-MAX is unexcelled.
3. MO-MAX is economical. Its specific gravity is about 8% less than that of 18% tungsten steel.
4. MO-MAX is available in a standardized composition; also in cobalt and high vanadium varieties for special high speed steel requirements.
5. For 14 years MO-MAX has demonstrated its superiority in all types of cutting tools.

Learn all the facts! **Send for your copy of the MO-MAX Handbook, sixth edition. Get the full story about this remarkable steel, including easy-to-follow instructions on heat treating.**

THE CLEVELAND TWIST DRILL COMPANY

1258 East 49th Street • Cleveland 14, Ohio

Buyer's Guide to Brands of MO-MAX

"LMW"	Allegheny Ludlum Steel Corporation
"MOHICAN"	Atlas Steels Limited
"BETHLEHEM HM"	Bethlehem Steel Company
"MO-CUT"	Braeburn Alloy Steel Corporation
"STAR MAX"	Carpenter Steel Company
"MOLITE M-1"	Columbia Tool Steel Company
"REX T-MO"	Crucible Steel Company of America
"DI-MOL"	Henry Disston & Sons, Inc.
"HI-MO"	Firth-Sterling Steel Company
"REX T-MO"	Halcomb Steel Company
"MOGUL"	Jessop Steel Company
"TATMO"	Latrobe Electric Steel Company
"MIDMAX"	The Midvale Company
"S. T. M."	Simonds Saw & Steel Company
"MO-TUNG"	Universal-Cyclops Steel Corporation
"8-N-2"	Vanadium-Alloys Steel Company
"VUL-MO"	Vulcan Crucible Steel Company

NEW

Electropolishing solution for brightening stainless steel

by Du Pont

OUTSTANDING ADVANTAGES:

1. **PRE-MIXED**—ready for immediate use; contains correct proportion of ingredients for most effective performance.
2. **REMAINS LIQUID**—does not freeze or solidify at room temperatures; reaction products form sludge which is easily removed.
3. **ONE SOLUTION**—for original installation, maintenance and replenishment.
4. **WIDE OPERATING RANGE**—more efficient at higher or lower current density than other solutions.
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6. **ECONOMICAL**—long life; solution need not be discarded due to slime formations.
7. **NON-TOXIC**—no harmful fumes, no noxious odor.
8. **NON-EXPLOSIVE**—no risk of vapor ignition, violent chemical reaction, or detonation.

Extensive tests in both large and small installations prove that this new and better Electropolishing Solution has many unusual and outstanding advantages. Developed for the polishing of chromium-nickel types of stainless steel, it may be used on chromium alloys as well.

For further information and prices, write or call our nearest district office. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

DISTRICT OFFICES: Baltimore, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, El Monte, Calif., New York, Philadelphia, Pittsburgh, San Francisco.

DU PONT ELECTROCHEMICALS

BETTER THINGS FOR BETTER LIVING
..THROUGH CHEMISTRY

DU PONT
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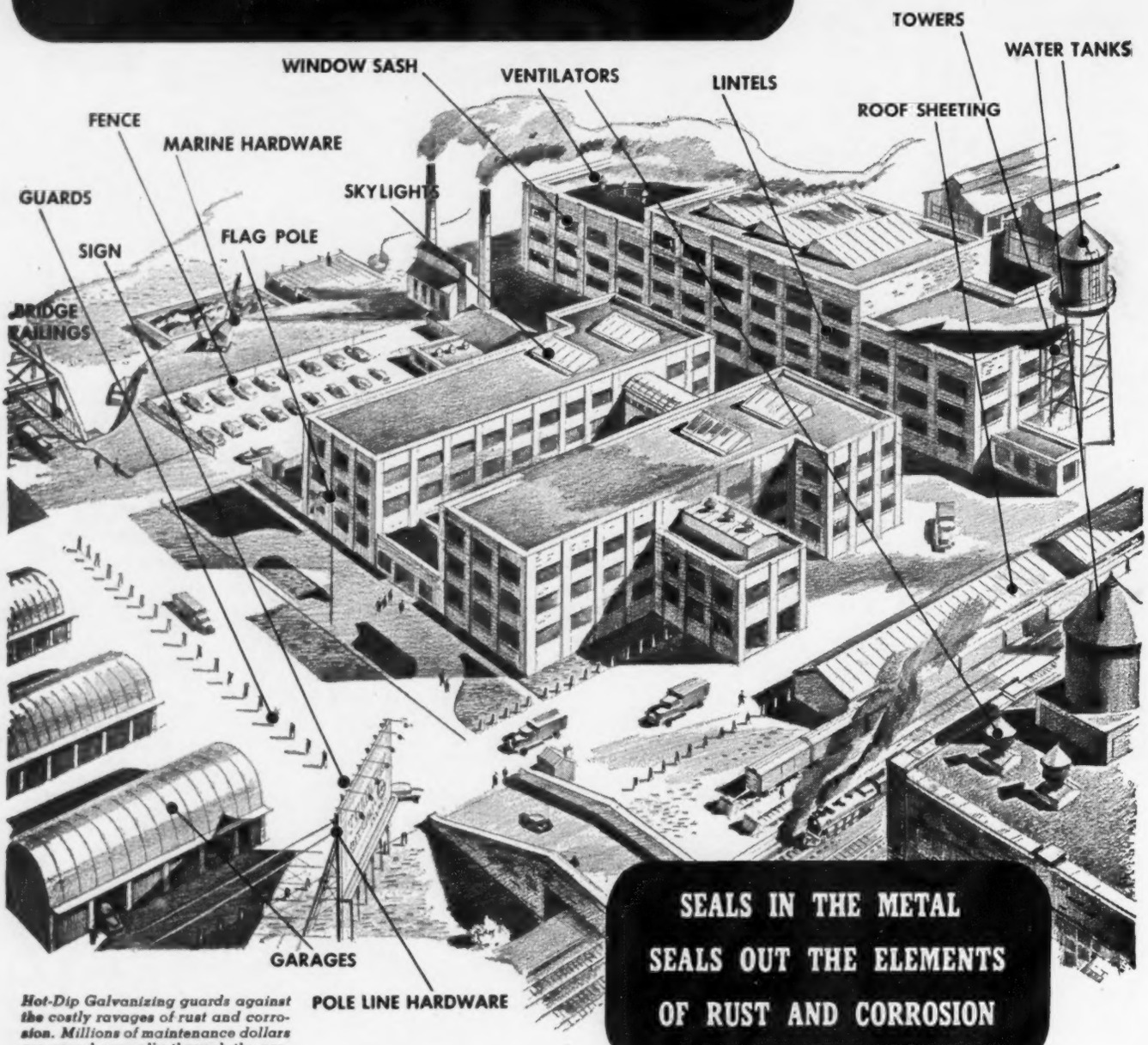
DIPPED IN MOLTEN ZINC

For the utmost in Rust Prevention



SEALS IN THE METAL
SEALS OUT THE ELEMENTS
OF RUST AND CORROSION

Hot-Dip Galvanizing guards against the costly ravages of rust and corrosion. Millions of maintenance dollars are saved annually through the protection of Hot-Dip Galvanizing.

Factory Management, Engineers, and Plant Owners *know* what maintenance and replacement annually cost industry. Hot-Dip Galvanizing has long demonstrated the tremendous savings that can be effected by protecting expensive structures and installations from the elements that cause rust and corrosion.

Hot-Dip Galvanizing, through the high temperatures involved in the process, creates a positive fusion of zinc with base metal. This bond holds the best possible protective zinc coating to the base metal.

Records prove, throughout the years—under every climatic condition—that where metal is sealed in zinc it cannot rust.

Write regarding rust and corrosion problems to American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pennsylvania.

For the best Zinc Coating use **hot-dip GALVANIZING**

Sure, they LOOK ALIKE from where you sit

. . . but what a difference under the paint!

One of those gleaming new fenders is regular low-carbon steel; the other is N-A-X HIGH-TENSILE.

Because of the high yield strength of N-A-X HIGH-TENSILE, fenders and similar parts made of this steel will be considerably more resistant to denting. This characteristic, combined with other desirable properties of N-A-X HIGH-TENSILE, assures longer life with less maintenance cost.

N-A-X HIGH-TENSILE's finer grain structure and higher hardness make possible a better finish without costly surface preparation.

N-A-X HIGH-TENSILE's higher corrosion (rust) resistance means that the fender will keep its new-car look and style much longer.

From any angle you look at it — manufacturer's, fabricator's, owner's—the N-A-X HIGH-TENSILE fender is far and away the better buy!

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
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HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
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It looks right!
It feels right!
It works right!

REGO GX
WELDING TORCH

NCG

EVERYTHING FOR WELDING

NCG is recognized as one of the largest organizations of its kind in the world. It operates 73 manufacturing plants within the United States, offers supply and service by a vast network of hundreds of independent NCG distributors and warehouse stocks. For assured satisfaction in *your* welding and cutting needs . . .

RELY ON NCG

Because welding is an art, and not an exact science—the tools of welding in the hands of welders must have special, hidden qualities—not visible in engineers' drawings. There is the right *look* to the *welder's* eye, and the right *feel* to the *welder's* trained grasp . . . that can turn the welding production chart trend lines up or down.

The Rego GX Welding Torch has the look of an old, experienced teammate to most welders. It seems to say, "I'm going to make this job easier for you." And when the welder wraps his fingers around the lightweight, sure-grip, balanced handle—and gets that *just-right* feel—he knows that the Rego GX Welding Torch spoke a mouthful of truth.

To be sure, the Rego GX Welding Torch was born of engineers' drawings, because the GX *works right* too, in the judgment of *more* than the welder alone. It respects your accounting department's interest in economical operation, it serves your personnel department's wish to hold worker fatigue to a minimum and to provide safety, and it really humps its back for the aims of your production and maintenance superintendents.

The reason the Rego GX can satisfy all these top-to-bottom demands is that no facility was spared in its development. Metallurgy, physics and mechanical engineering joined with 30 years' first-hand knowledge of welding practices to perfect its design.

You can have the details of its tough stainless steel head; its exclusive aluminum alloy handle—free of tubes, screws and soldered joints; its ingeniously safe, efficient gas mixer; its full range of mirror-burnished GX Welding Tip Assemblies that provide uniformly faultless flame characteristics—by writing for bulletin NR116 which also describes the SX Torch for light welding.

NATIONAL CYLINDER GAS COMPANY
840 N. MICHIGAN AVE., CHICAGO 11, ILL.

WITH THIS NEW SPEED AND FEED SELECTOR FOR *Enduro* STAINLESS STEEL BARS

SEND FOR YOUR SPEED AND FEED SELECTOR—TODAY. You'll find it one of your most valuable aids in machining ENDURO Stainless Steel Bars. *AND IT'S FREE!*

On one side it shows QUICKLY the recommended speeds and feeds for all automatic screw machine operations on the popular stainless steel analyses.

On the other side it gives spindle speeds in surface feet or revolutions per minute—together with the main chemical components of the machining stainless steels.

And for those who wish to hang it at their machines or drawing boards, it's punched and reinforced with a metal eyelet.

Get your Selector NOW—by writing to:

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NOW AVAILABLE FOR QUICK DELIVERY
Republic ENDURO Stainless Steel Bars, hot rolled or cold finished—also Wire—in a complete range of sizes and types.

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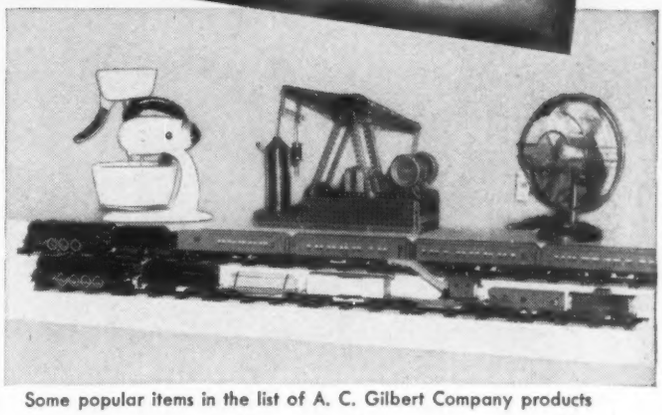
GAS... flexible TOOL for Production-line Heat Processes

When you need heat for drying, for metal-melting, for process steam, for any of the production-line heating requirements you need GAS and modern Gas Equipment.

And for proof of the many successful applications of the productive flames of GAS in modern industrial practice you need only look at the experience records of A. C. Gilbert Company, famed producer of miniature trains, scientific toys, motor-driven appliances.

In its modern New Haven, Connecticut, plant the company's production engineers have applied GAS to heating processes such as:

- **Pre-melting furnaces for metal used in die-casting**
- **Molten-metal reservoirs of die-casting machines**
- **Remelt furnaces for reclaiming scrap metal**
- **Salt bath for gear hardening**
- **Boilers supplying steam for bakelite mold-heating**
- **Continuous cycle and convection drying and enameling ovens**



Some popular items in the list of A. C. Gilbert Company products

These varied examples demonstrate the applicability of GAS to the widest range of production-line processes. You can obtain full details on the use of GAS in modern productioneering by calling your local Gas Company.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVE.
NEW YORK 17, N. Y.

Gas-fired traveling conveyor oven where Erector set parts are coated and dried

Automatic controls assure proper paint-drying temperatures in Gas convection ovens

Gas-fired boilers supply steam to the bakelite molding presses

NIAGARA *announces*

a new ELECTRONIC AUTOMATIC WELDING *machine*

The advantages of mechanized Automatic Welding are illustrated in Bulletin 83. Write for your copy.

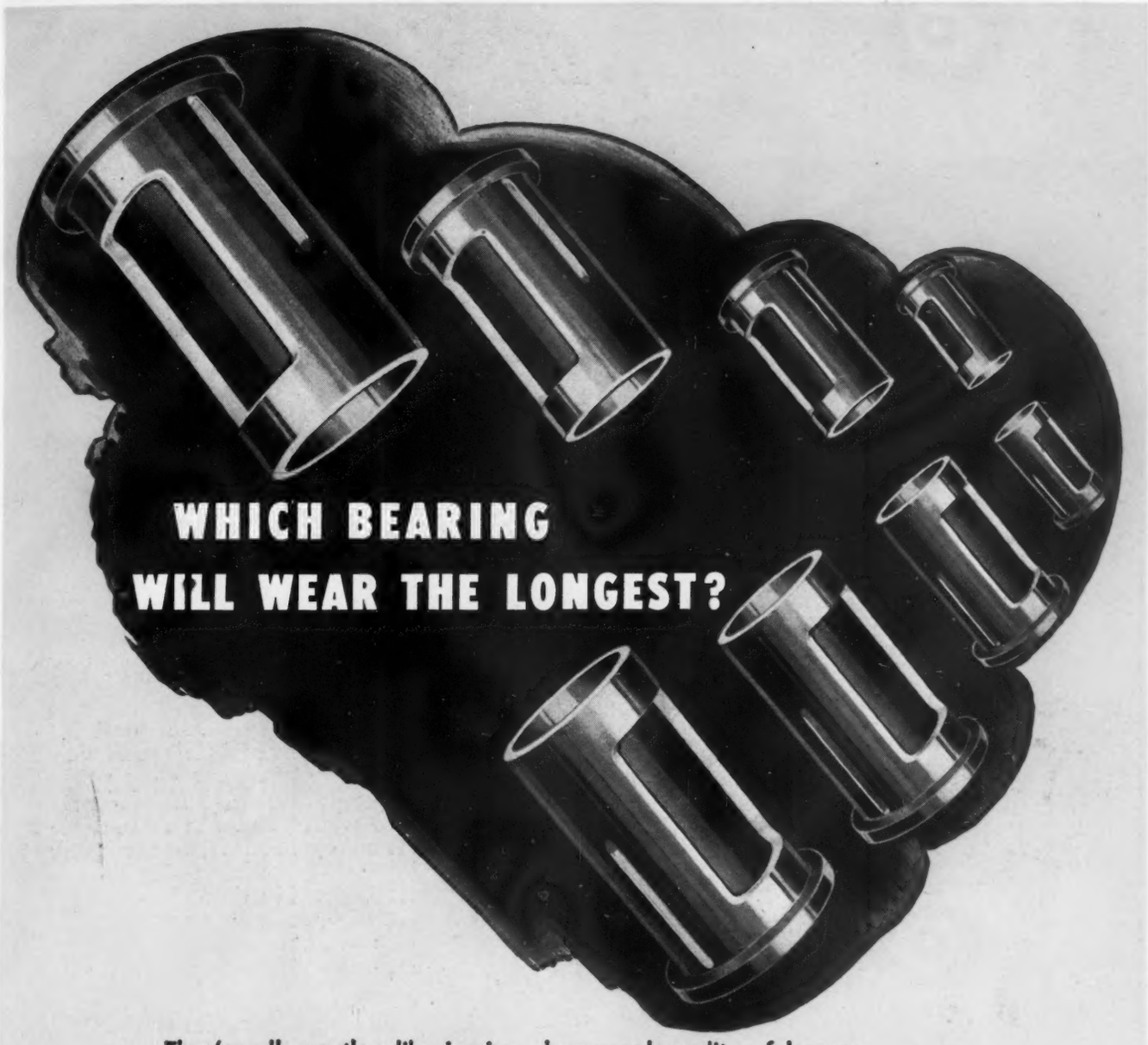
• One man operation, faster welding, less passes per seam, stronger and better quality welds at lower labor costs are made possible by this new Niagara Electronic Automatic Welding Machine.

Electronic control provides variable speed of the machine along a track so that the length of welding is governed only by the track length. Welds perpendicular to the track are accomplished by traveling the welding head at a variable speed along the cantilever beam. Centralized fingertip, push button control quickly brings the power elevated beam to any height position thereby providing maximum speed in changing from one setup to the next whether the job be a long slender member or a massive frame.

NIAGARA MACHINE AND TOOL WORKS

District Offices: CLEVELAND • NEW YORK • DETROIT

637-697 NORTHLAND AVE., BUFFALO 11, N. Y.



They're all exactly alike in size, shape and quality of bronze.
But there's a mighty important invisible difference—the *alloys*.

That slight change in composition—often only a fraction of one per cent—can make a huge difference in service. Through years of research N-B-M has perfected scores of "minor" variations for different requirements which give bronze bearings and parts far longer life.

A new N-B-M alloy may be just the answer you're looking for.

N•B•M
BRONZE BEARINGS AND PARTS

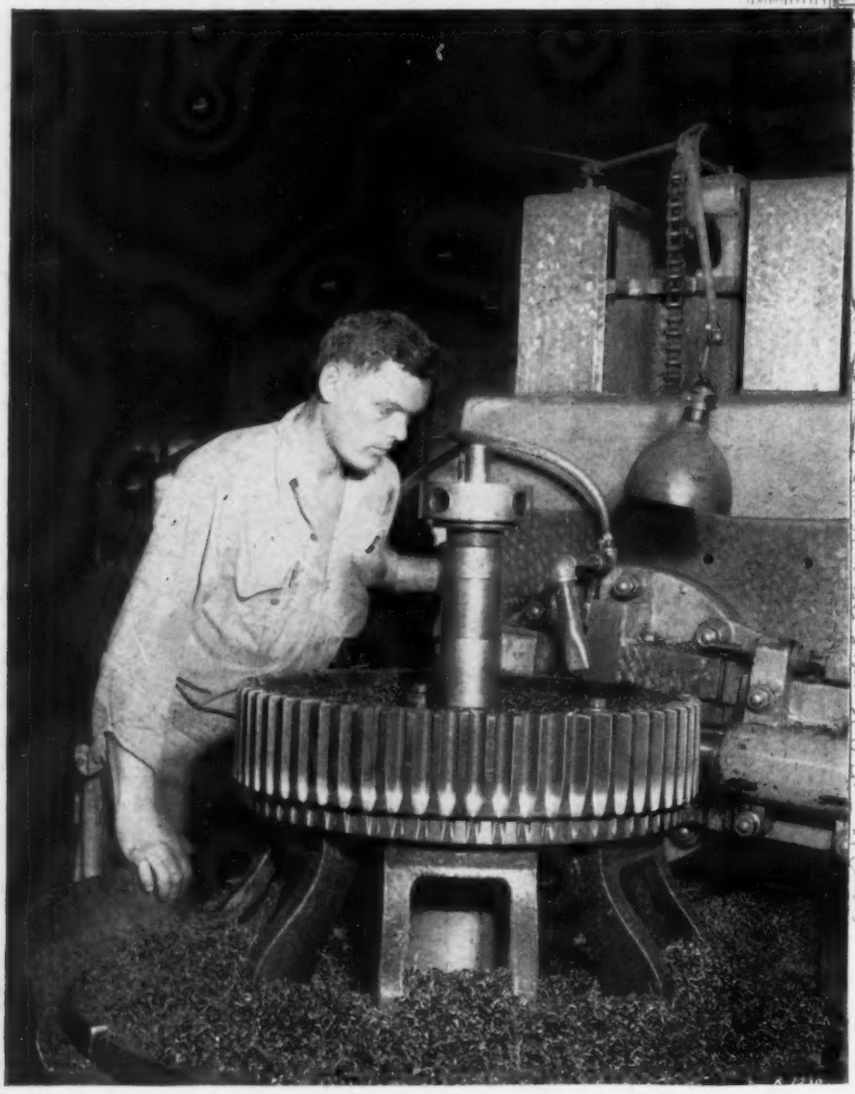
NBM

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION
ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

Gears for Every Purpose



Generating a spur gear on a 60" vertical hobbing machine.

QUIET.....

A noticeable characteristic of accurately cut gears is smooth, *quiet* operation. "You can hardly hear it" has been frequently said of Illinois Gear installations.

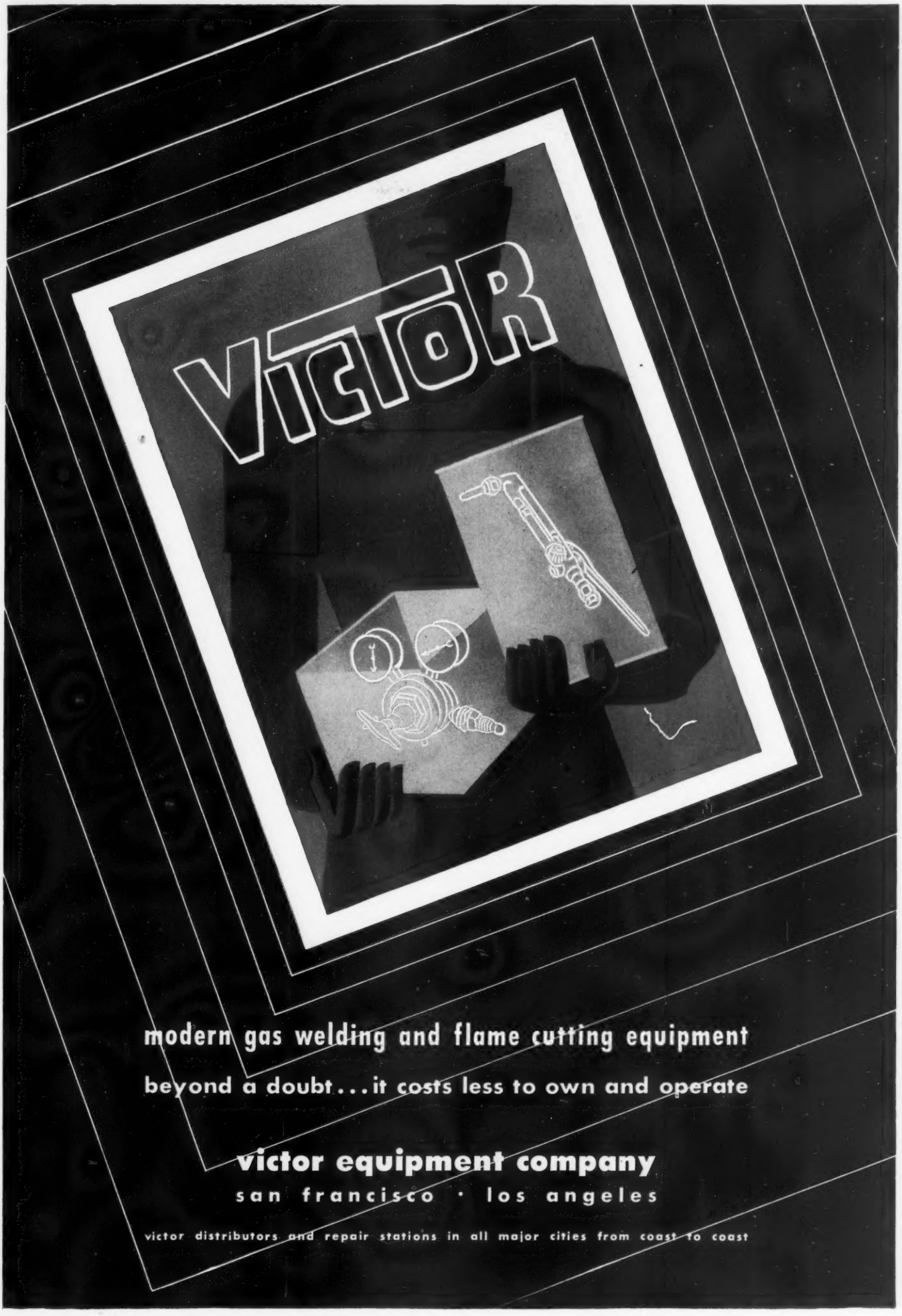
Back of this *silence* that eloquently attests efficient performance stand the most advanced gear-cutting facilities, craftsmanship of the highest caliber, and the "know how" that comes from broad experience, including the production of gears for the most difficult specifications.

Your request for Catalog 39 will prove an important first step in obtaining finer gears.

ILLINOIS GEAR & MACHINE CO., CHICAGO 35, ILLINOIS

MAKERS OF CUT GEARS AND PINIONS OF ALL TYPES AND SIZE

ILLINOIS GEAR & MACHINE COMPANY



modern gas welding and flame cutting equipment

beyond a doubt . . . it costs less to own and operate

victor equipment company

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What does it take to build a good coke oven plant?

IT TAKES A GOOD BASIC DESIGN.

We believe the Koppers-Becker Coke Ovens have the best of all designs . . . sturdy, free from complications, simple to control, with the largest practical coking capacity. This design can be used over a wide variety of conditions, making metallurgical or domestic coke with heating by any kind of fuel gas normally available, and in large or small sized ovens. The ovens are accessible throughout; this means low maintenance and long life.

IT TAKES CONSTANT ENGINEERING REFINEMENT.

The number of coke oven plants which Koppers builds gives this company an unparalleled opportunity to develop new ideas to meet the new needs.

For example, the waste gas recirculation system was developed by Koppers to meet the need for greater coal carbonization capacity per oven. To produce more coke from ovens, it became necessary to make them greater in height. To get uniform heat in walls of very high ovens, when heating with coke oven gas, it was necessary to delay the rate of combustion. This has been accomplished with the waste gas recirculation system.

IT TAKES A FINE ENGINEERING STAFF.

The Koppers engineering staff has proved its ability to design and erect the most advanced and efficient coal carbonization, material handling and gas treatment equipment.

K
KOPPERS

KOPPERS COMPANY, INC. KOPPERS BUILDING, PITTSBURGH, PA.

DSM SPECIAL MOTOR WASHING MACHINE

MODEL BD-1309

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

A	Width (Working Clearance)	44″		
B	Height (Working Clearance)	24″		
C	Width Over All	65″		
D	Length Over All	26′8″		
E	Height Over All	8′0″		
G	Wash Pump Capacity, G.P.M.	450		
	Motor Speed R.P.M.	1750		
	Motor H.P.	15		
	Wash Tank Capacity, Gals.	750		

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

FORMED COWLINGS, PANELS, ETC.: *To your specification, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING MACHINES • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

DETROIT SHEET METAL WORKS, 1296 OAKMAN BOULEVARD, DETROIT 6, MICHIGAN

DETROIT SHEET METAL WORKS

DETROIT - 6 - MICHIGAN

"Switching Is Much Faster With Our PLYMOUTH LOCOMOTIVE"

At the West Shreveport, La., plant of Frost Lumber Industries, Inc., two 12-ton Plymouth Locomotives have been in constant service for the past five years, moving materials between various locations in the plant and yard.

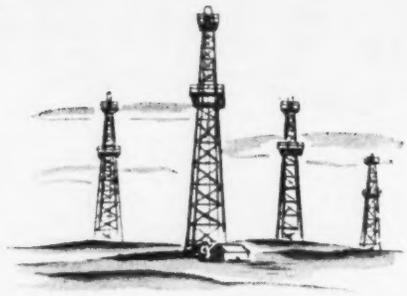
This Plymouth user reports: "Our Plymouths are in constant use . . . most satisfactory in our operation . . . they are powerful and economical. We handle our switching in half the time required by former methods."

Less time and labor spent on intraplant transportation means proportionate savings in total production costs. There's a Plymouth Locomotive designed to do your haulage work quickly and economically. Write for complete information. Plymouth Locomotive Works, Dept. A-1. Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.



For unusual and large size bearings . . .

like the large, 48" OD angular contact ball bearing illustrated, or for other heavy duty, large size, or out-of-the-ordinary anti-friction bearing requirements,

Our specialized experience can help you.

Designing and building special anti-friction bearings such as ball-reciprocating, ladder type and radial roller bearings, as well as all major types of standard large size bearings, have long been a major activity of Torrington's Bantam Bearings Division. This background of experience is available to assist you in similar or entirely new problems involving the application of anti-friction engineering principles.

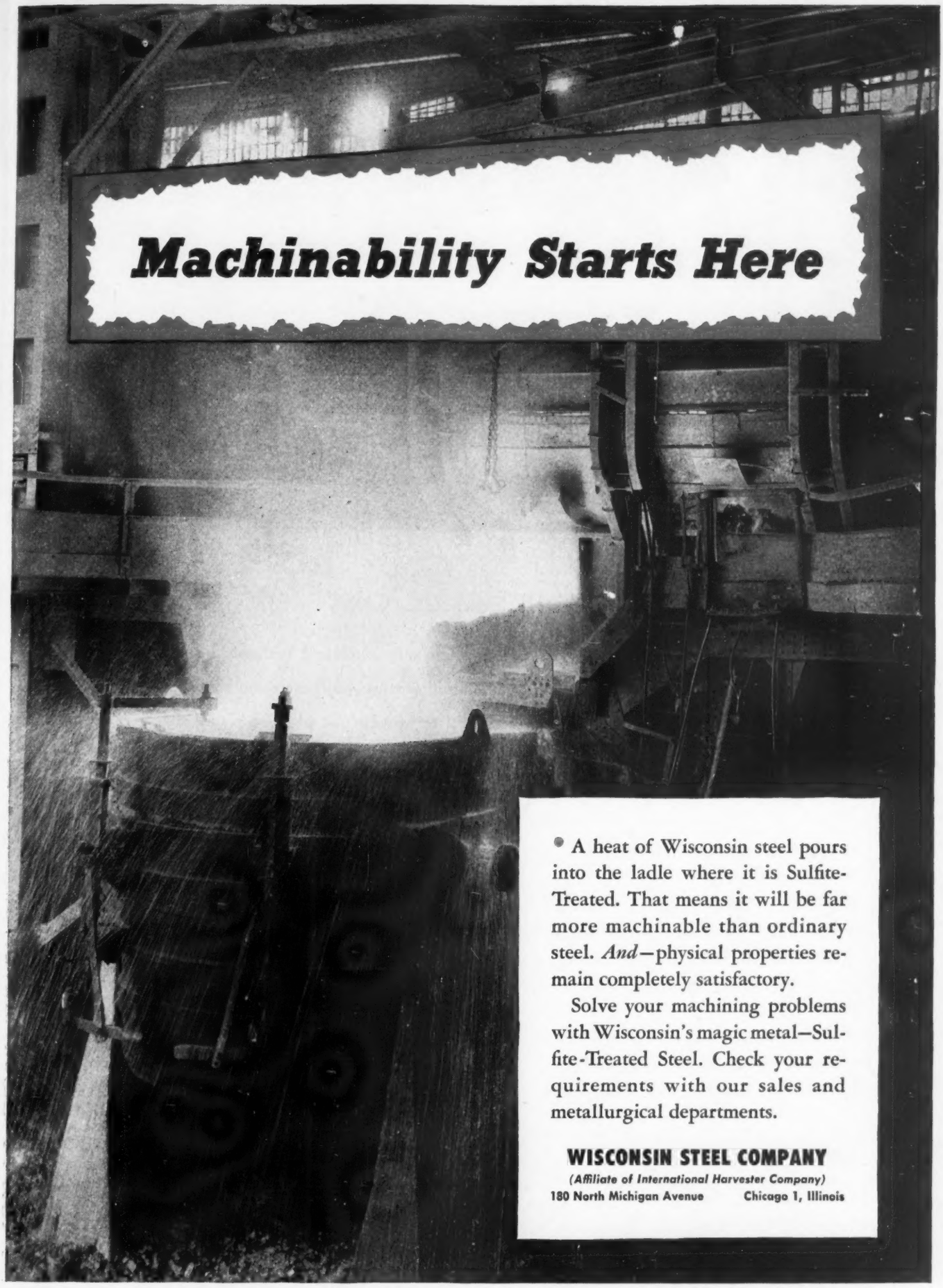
THE TORRINGTON COMPANY

SOUTH BEND 21, INDIANA TORRINGTON, CONN.

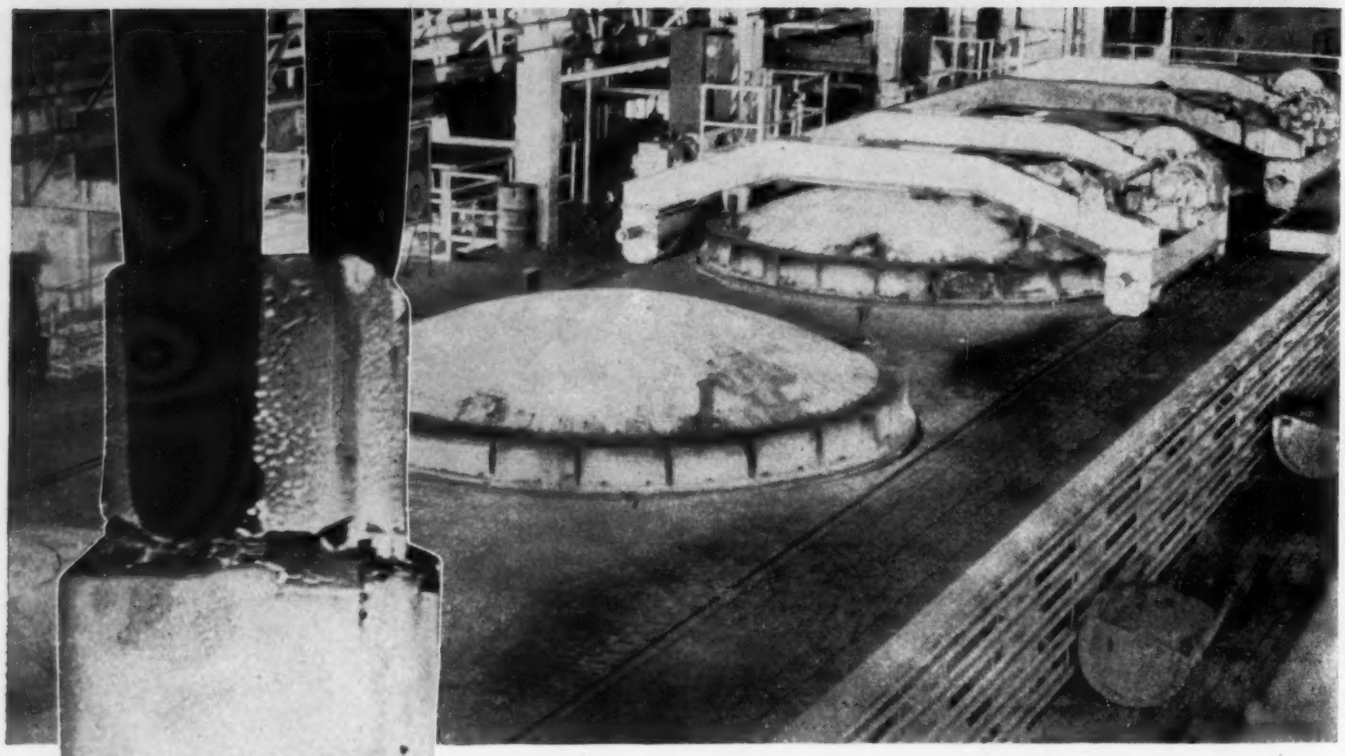
Offices in All Principal Cities

TORRINGTON BEARINGS

• NEEDLE • SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • BALL •


Machinability Starts Here
• A heat of Wisconsin steel pours into the ladle where it is Sulfite-Treated. That means it will be far more machinable than ordinary steel. *And*—physical properties remain completely satisfactory.
Solve your machining problems with Wisconsin's magic metal—Sulfite-Treated Steel. Check your requirements with our sales and metallurgical departments.
WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN SULFITE-TREATED STEEL



THE SALEM CIRCULAR SOAKING PIT

Offers the maximum operating economy by the effective use of temperature control and combustion control. The temperature control on the circular pit is so placed that it reads actual pit temperature thus making possible very high firing rates without the inherent danger of overheating the pit or metal. At these high firing rates it is necessary to maintain very accurate combustion control as a measure of fuel economy and for proper pit atmosphere as a control of the ingots scaling rate and surface conditioning. Further economy may be gained by the addition of recuperation.

Here's an absolutely unretouched photo—observe the results.

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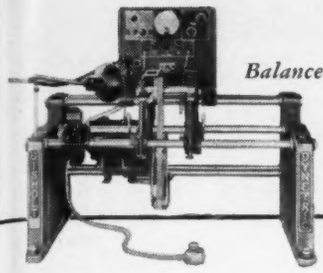
SOUTHWEST OFFICE · FORT WORTH, TEXAS
SALEM ENGINEERING CO., (Canada) Ltd., TORONTO
SALEM ENGINEERING CO., Ltd., SHEFFIELD, ENGLAND

SALEM

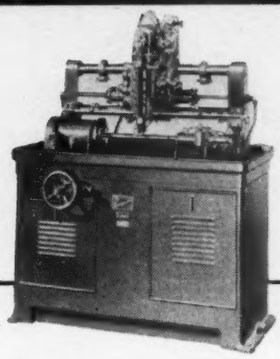
ALL OFFICES STAFFED FOR . . . ENGINEERING, CONSTRUCTION and OPERATION

Salem Builds

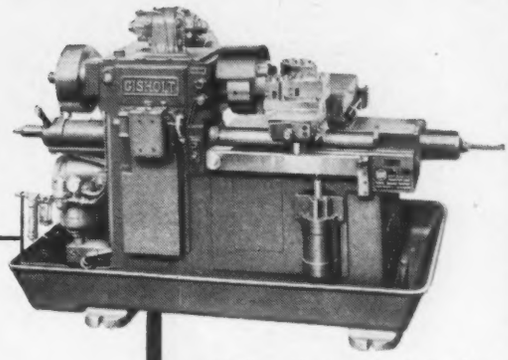
CIRCULAR SOAKING PITS · CAR BOTTOM FURNACES · NEEDLE METALLIC RECUPERATORS
ROTARY HEARTH FURNACES · FORGE FURNACES · AIR RECIRCULATING FURNACES
CONTINUOUS BUTT-WELD FURNACES · HEAT TREATING FURNACES · GAS ATMOSPHERE FURNACES
MECHANICAL EQUIPMENT FOR CHARGING AND DISCHARGING MATERIAL FROM FURNACES



Balancers

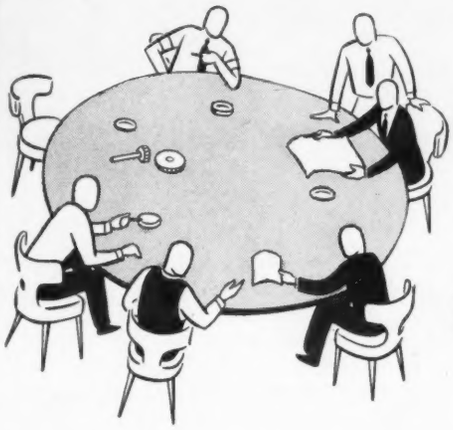


Superfinishers



Hydraulic Automatic Lathes

If you produce parts that are Round or Partly Round



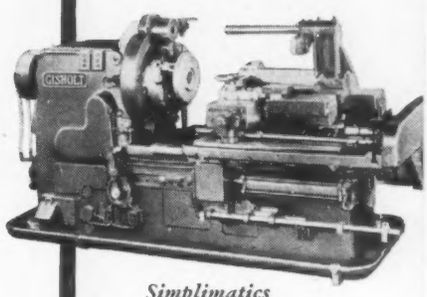
meet us at the "GISHOLT ROUND TABLE"

Yes, for a half century, here at Gisholt, we've concentrated our efforts upon the building of equipment to produce parts that are round or partly round. And a good share of our job is helping others to use it most efficiently.

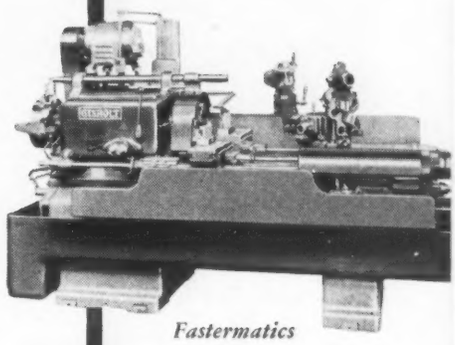
There's where the "Gisholt Round Table" comes in—as a clearinghouse for practical ideas. Gisholt engineers live with production problems day in and day out, visiting hundreds of plants each year. Whatever your work may be in the realm of machining, surface-finishing or balancing of round or partly round parts, Gisholt specialists will gladly help you.

Now, and in the years ahead, more emphasis than ever will be placed upon better methods, increased efficiency and lower costs.

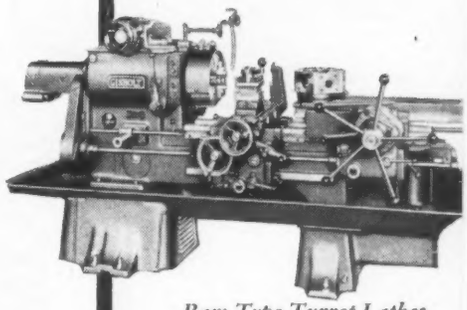
Call your nearest Gisholt Representative. Or, if you wish, come to Madison and consult the "Gisholt Round Table."



Simplimatics



Fastermatics

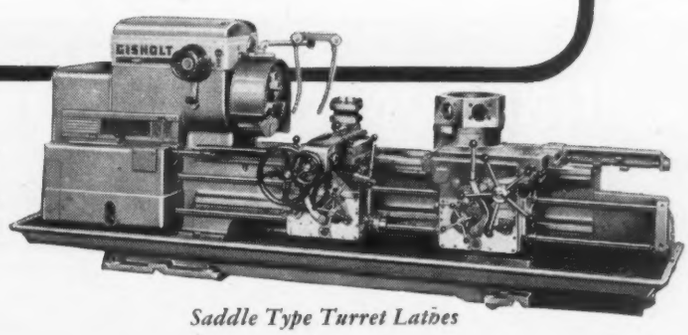


Ram Type Turret Lathes

GISHOLT MACHINE COMPANY
Madison 3, Wisconsin

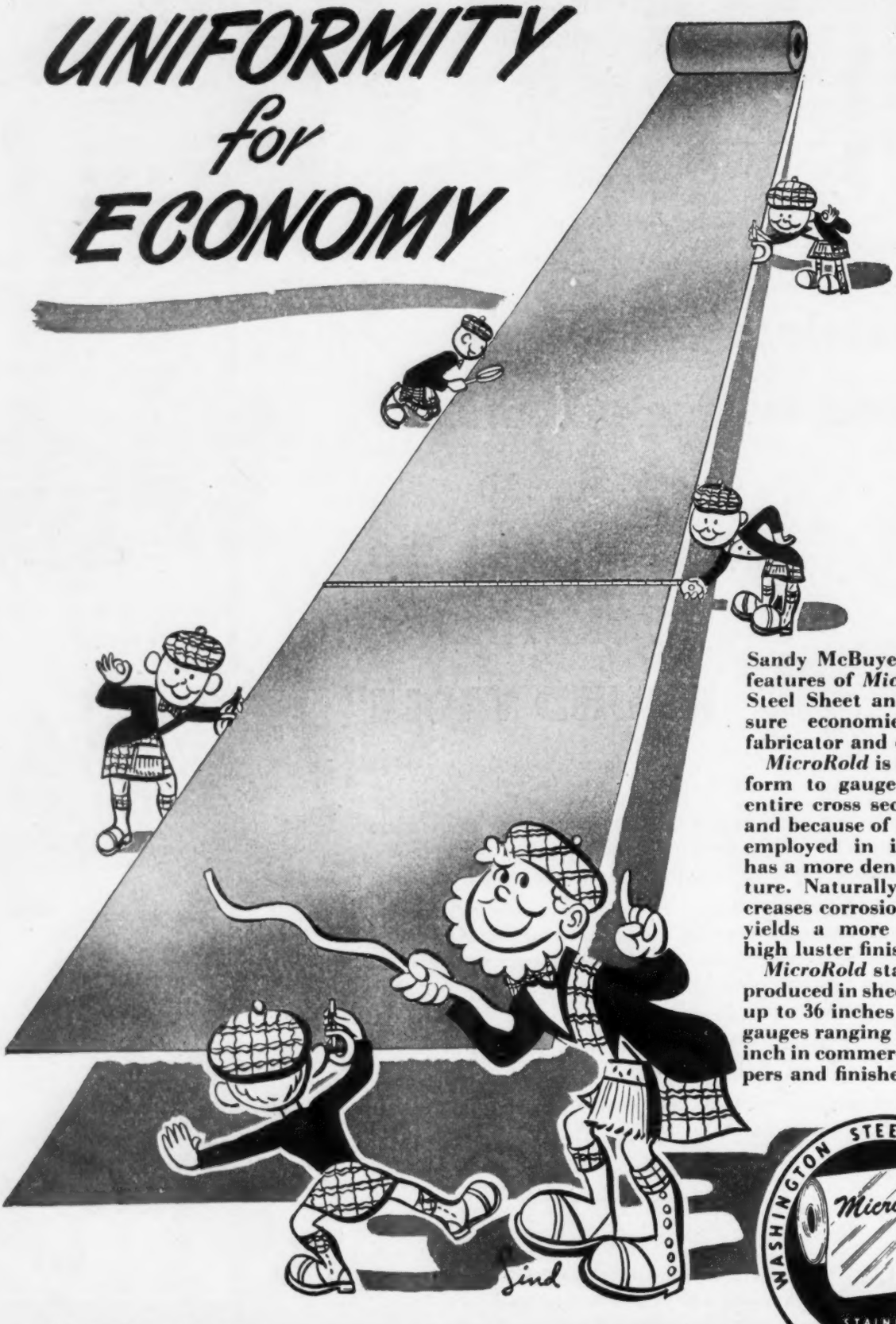
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS
BALANCERS • SPECIAL MACHINES

See all these—and other Gisholt machines on actual production jobs at the Machine Tool Show.



Saddle Type Turret Lathes

UNIFORMITY for ECONOMY



Sandy McBuyer points out the features of *MicroRold* Stainless Steel Sheet and Strip that assure economies to both the fabricator and end user.

***MicroRold* is remarkably uniform to gauge throughout its entire cross section and length, and because of unique practices employed in its manufacture has a more dense surface structure. Naturally, this feature increases corrosion resistance and yields a more easily obtained, high luster finish.**

***MicroRold* stainless alloys are produced in sheet and strip form up to 36 inches in width and in gauges ranging from .078 to .004 inch in commercial grades, tempers and finishes.**

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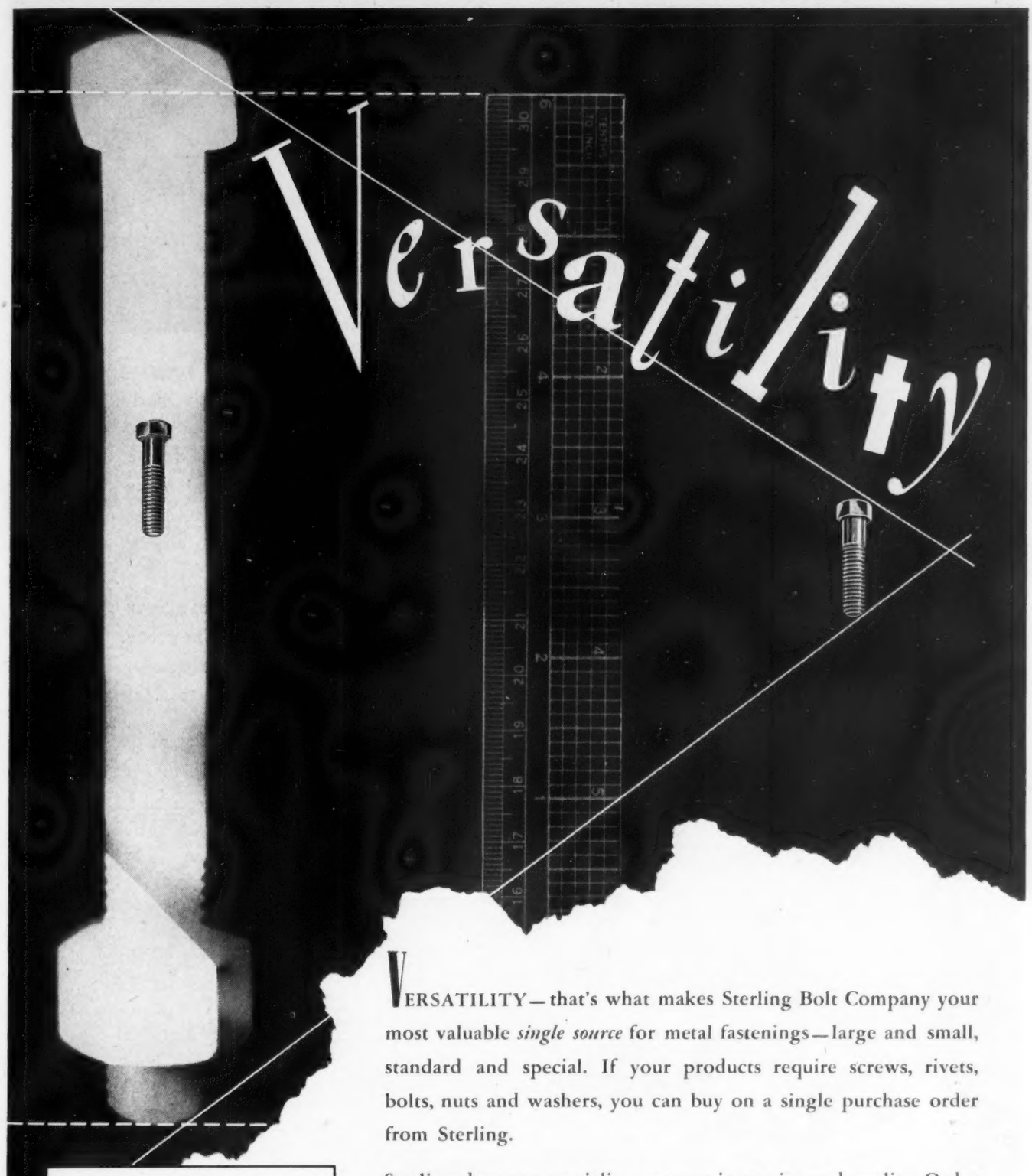
WASHINGTON STEEL CORPORATION
MicroRold
STAINLESS
SHEET & STRIP

WASHINGTON STEEL CORPORATION

WASHINGTON, PA.



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Sterling does not specialize—except in service and quality. Order and reorder the easy, economical, efficient way—from Sterling.

Sterling makes a wide variety of metal fastenings, both standard and special. All metals . . . all finishes . . . all sizes.

BOLTS	NUTS
Carriage	Square • Hexagon
Machine	Cold-Punched
Plow	Hot-Pressed
Step	Semi-finished
Elevator	**SCREWS**
Lag	Cap • Set
Stove	Machine
	Socket Head

During these times of scarcity, you may find items available in our stocks which would help you through production problems. Inform us of your needs and write for a copy of our current stock list.

STERLING BOLT CO.

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HARRISON 9880

SALES OFFICES: Union Trust Bldg., Cincinnati 2, Ohio; 17 W. Market St., Indianapolis 4, Ind.; 161 W. Wisconsin Ave., Milwaukee 3, Wis.; 1228 N. Hadley St., St. Louis 6, Missouri

Here They Are In One Handy Box...

The 16 Most Popular Shapes and Sizes of Norton Mounted Points

HANDY to buy, handy to use, handy to keep — that's the Norton No. 16 Mounted Point Assortment. It's made up of one each of the sixteen sizes and shapes which Norton sales records show are most in demand. They're packaged in an ingenious box which brings them to you safely, serves as a handy holder while they are in use and a sturdy container when they are not.

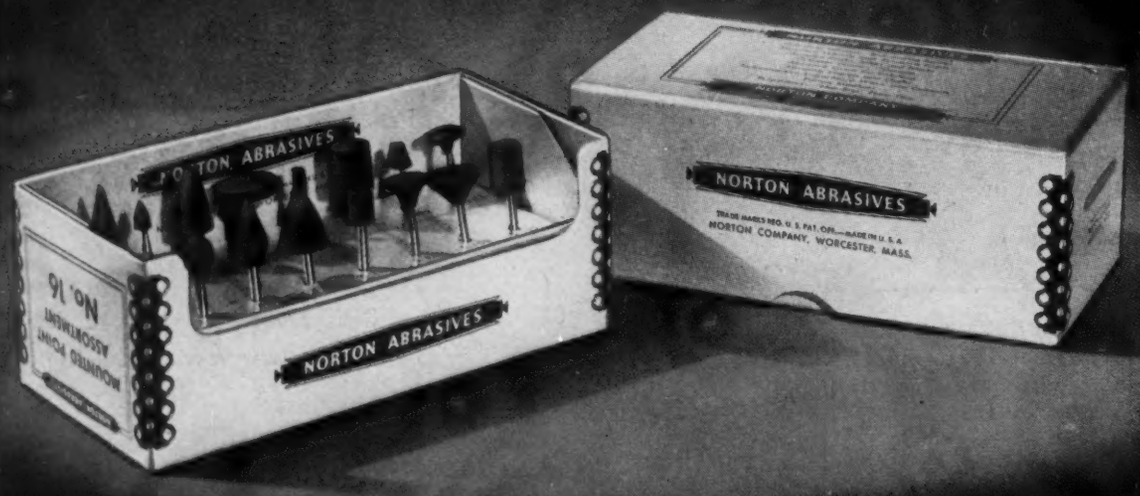
The points are the same Norton product that's been so popular with tool makers for years. They are made of fast, cool cutting 38 ALUNDUM abrasive, vitrified bonded and strongly cemented on steel spindles.

Order one or more No. 16 Mounted Point Assortments from your Norton distributor.

NORTON COMPANY, WORCESTER 6, MASS.

Distributors in All Principal Cities

W-1089



NORTON ABRASIVES

It's a Radar Part

Assembly is illustrated full scale. Brass screws and nuts bolt the flanges; brass terminal fittings hold the shielded leads; and because the base metal is copper, the cadmium plating is on to stay.

...but how to make it?

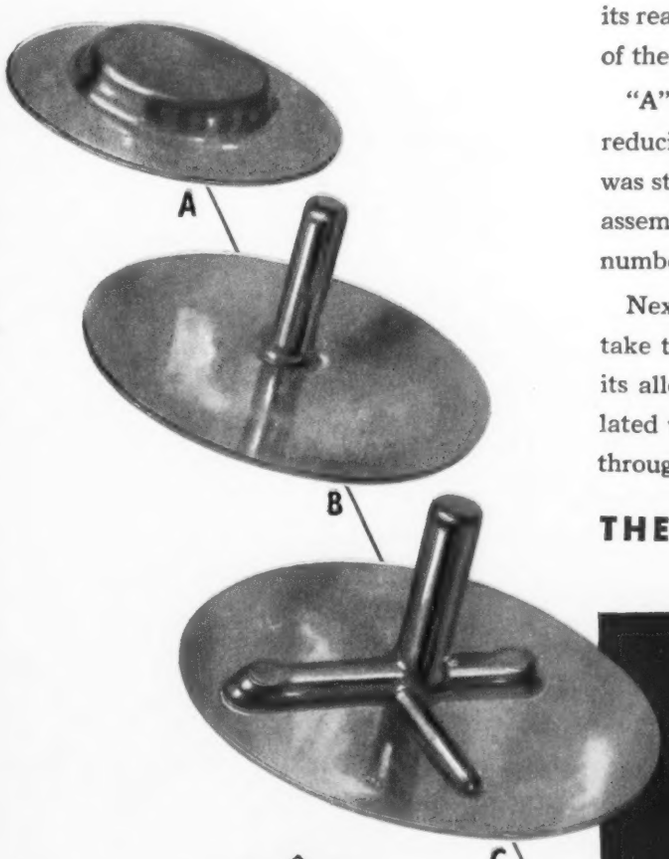
To the Guyer Metal Products Corp., of Chicago, Ill., the answer was simple . . . or relatively so, considering the complexity of the housing and the close dimensional tolerances required.

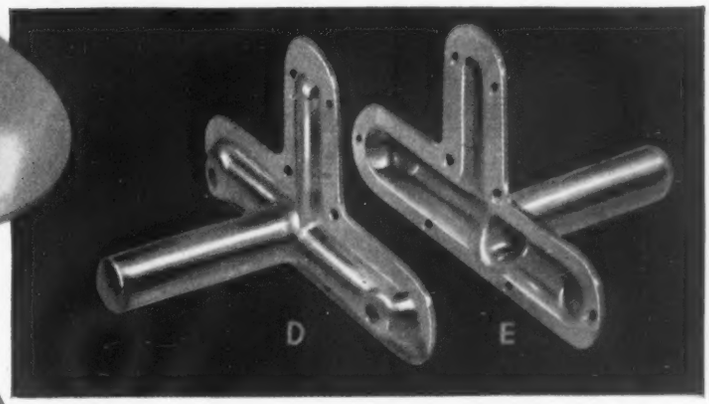
Anaconda Electrolytic Copper strip was used because of its ready adaptibility to cold working and the accurate gage of the metal furnished.

"A" shows the first blank and draw operation. A series of reducing operations resulted in "B". Next, the body, "C" was stamped—and this part was used for *both* halves of the assembly, "D" and "E", with variations in the form and the number of perforations.

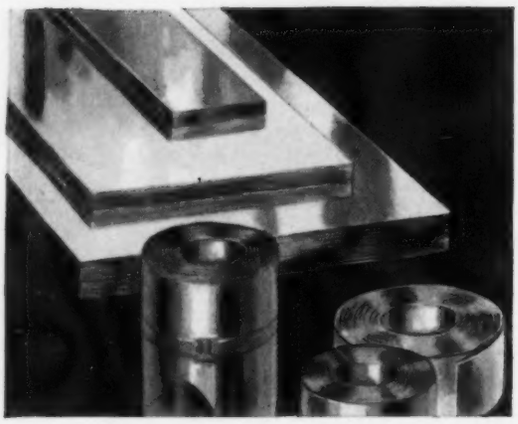
Next time you meet up with a problem in metal forming, take time out to consider; 1: the versatility of copper and its alloys, brass, bronze and nickel silver; 2: the accumulated wealth of metal-working experience available to you through our Technical Department.

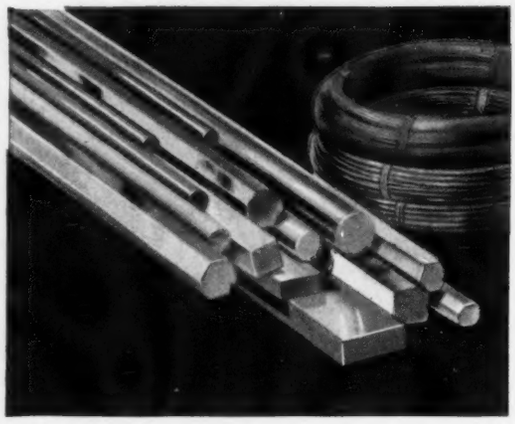
THE AMERICAN BRASS COMPANY
General Offices: Waterbury 88, Connecticut

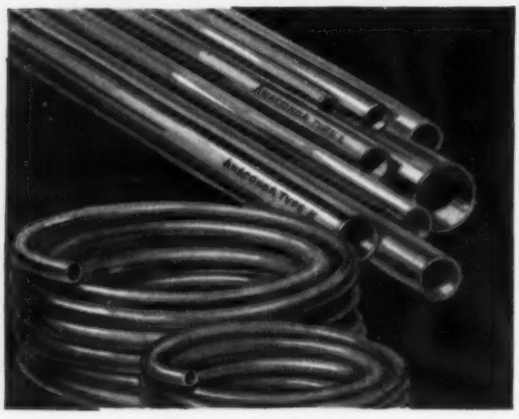


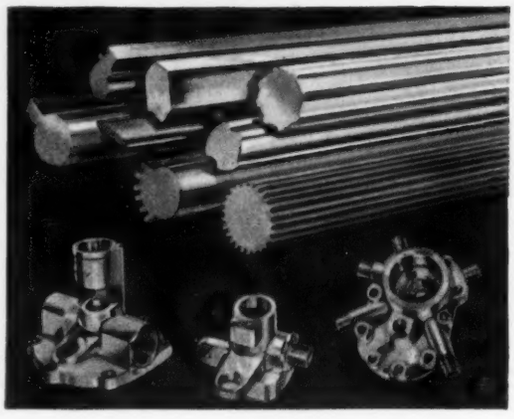


ANACONDA
Anaconda
COPPER AND BRASS









MOST VERSATILE
OF ALL COMMERCIAL METALS

And today, through modern metallurgy, that age-old versatility of copper alloys is enhanced in several ways... by combining a number of desirable properties in a single alloy... by widening the choice of materials for ordinary and specialized uses... by assuring products that give unexcelled performance under a wide variety of service.

The American Brass Company produces Anaconda Copper and Copper Alloys in practically all commercial forms; also in special shapes and die pressed forgings. Whether your requirements are large or small, the personnel of Company Warehouses, District Offices and Anaconda Distributors will be glad to serve you. 47115

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA

Anaconda **COPPER and BRASS**

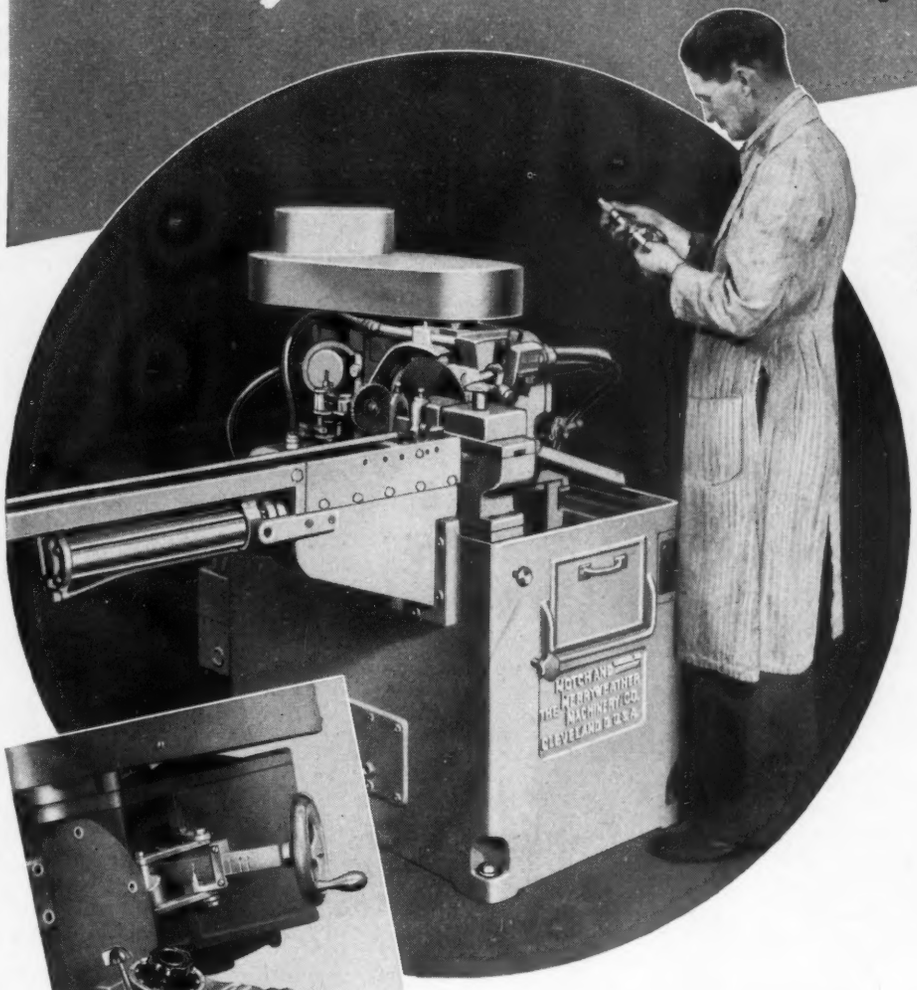
The Answers are Here . . .

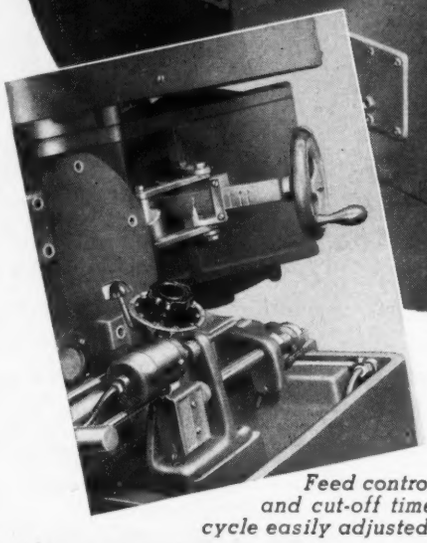
in the Motch & Merryweather

No. 00

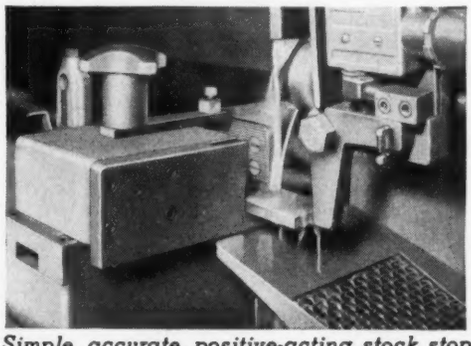
CIRCULAR SAWING MACHINE

Triple-Chip METHOD





Feed control and cut-off time cycle easily adjusted.



Simple, accurate, positive-acting stock stop starts automatic clamping and sawing cycle.

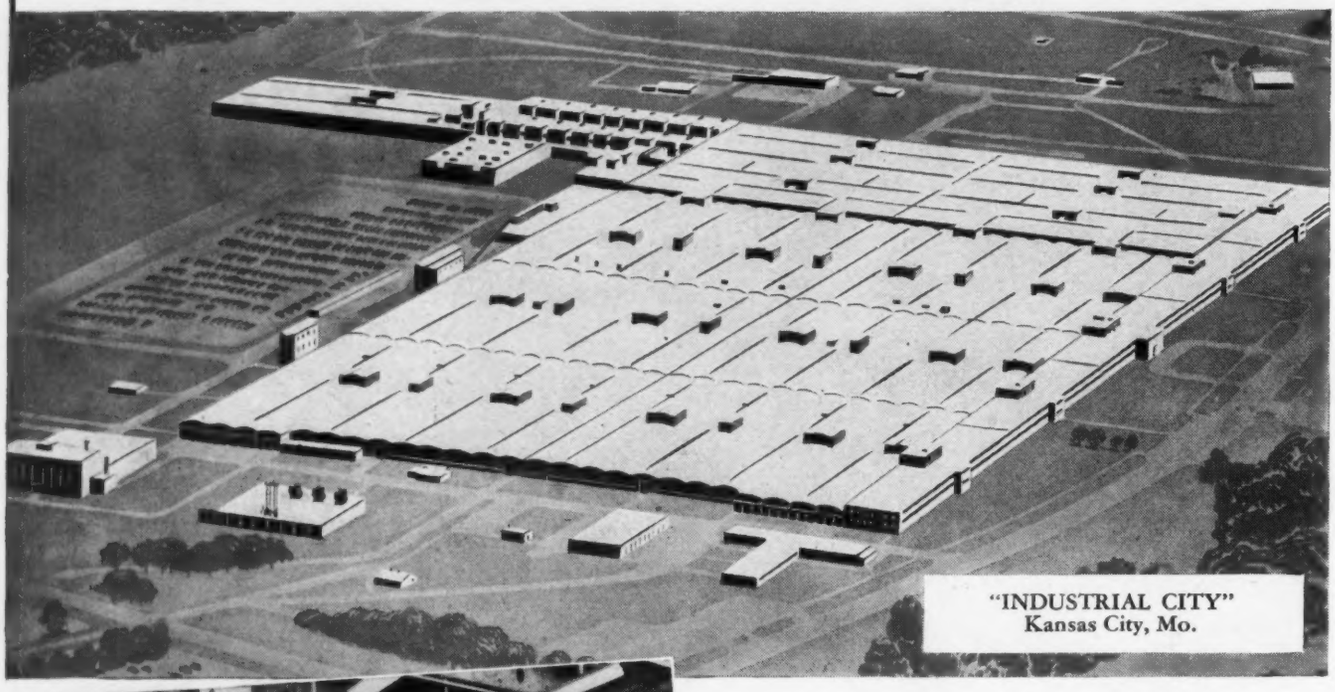
All the proven fundamentals of Motch & Merryweather design and construction which insure smooth, clean, burr-less sawing and eliminate most second operations. Accurate, uniform lengths; high speeds; quick change from size to size and material to material for stock up to 2". Thorough-going Motch & Merryweather engineering has provided Triple-Chip blades to fit and a blade sharpener to grind them — an experience based on "building all 3". The answers within this range of work are here.

For more information write for our well illustrated Bulletin S-6.

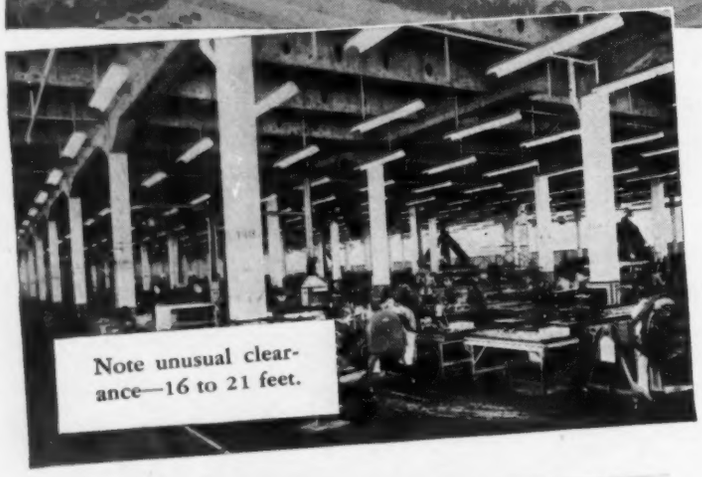
THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING CLEVELAND 13, OHIO

HERE'S

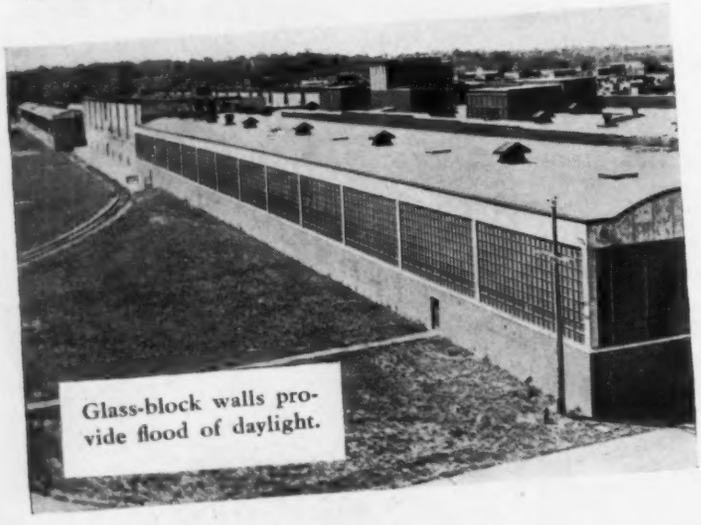
OPPORTUNITY WITH A CAPITAL "O"••



"INDUSTRIAL CITY"
Kansas City, Mo.



Note unusual clearance—16 to 21 feet.



Glass-block walls provide flood of daylight.

INVESTIGATE "INDUSTRIAL CITY"

A special factual brochure, entitled "Industrial City", has been prepared to help you judge the suitability and advantages of this fine, modern facility as a home for your business. It describes the many ways in which the space you may want can be organized for profitable production. It contains full information on the favorable rental basis—tells you how to go about acquiring space in this premier structure.

Write for your copy of "Industrial City" brochure today. Send your inquiry direct to War Assets Administration, Office of Real Property Disposal (P.O. Box 1037), Troost and Bannister Road (95th Street), Kansas City, Missouri.

This great property may be personally inspected any business day. Your own engineers and experts can make arrangements to study every aspect of the property to determine its advantages for you. Representatives are on the spot to answer all questions and help in working out arrangements to meet your specific requirements.

Title to the property will remain with the Federal Government and the Navy Department in the interest of national security.

••FOR MANY A SMALL BUSINESS

This Superb Plant Offers Exceptionally Favorable Conditions for Manufacturing Nearly Any Product

ALL UTILITIES AND SERVICES . . . ADAPTABLE SPACE
MODERATE RENTALS . . . PRIME LOCATION

Here is an outstanding opportunity for a broad range of manufacturing organizations to place their operations in a highly favorable industrial location and to participate in the profit potentialities of this modern industrial community.

War Assets Administration now offers space for lease in the great government-owned manufacturing plant at Kansas City—a plant generally acknowledged as one of the finest industrial structures ever built. The leases will be for periods up to 10 years, subject only to simple, straightforward stipulations in the interest of National Defense. Leases will be based on floor area and space requirements. The plant was originally built and operated for the production of Pratt & Whitney aircraft engines. It is offered for lease on a multiple tenancy basis, permitting smaller industrial organizations to share a common roof and common utilities and services and, at the same time, have the advantages of adequate space, proportionately equitable rentals and selected location.

The space to be leased aggregates nearly 3,000,000 sq. ft. in six buildings, all modern, all designed for maximum efficiency and economical operation. The over-all layout and physical plan provides outstandingly practical opportunity for many types of producers. The total productive area originally allowed for employment of 20,000 people, many of whom want to go back to work in this plant for you.

Building clearances and arrangements permit unusually broad ranges of machinery and equipment layouts and overhead work space. Personnel facilities, locker and washroom space, and other elements, are of superior design.

This plant is situated at Troost Avenue and Bannister Road (95th Street) and has spur track and three sidings of the Missouri Pacific Railroad. Paved roads lead to arterial highways. There is barge service at Kansas City to the Mississippi. Water is supplied by Kansas City; sewers are in and connect with the city system; power and light is furnished by Kansas City Power & Light Company and natural gas by Panhandle Eastern Pipe Line Company.

The advantages of a Kansas City, Missouri, address are well known. Whether you have a small or large operation, you have the advantage here of an established, growing market, fine transportation and economical distribution. Kansas City has a top reputation as a good town to live in, to work in, to sell from.

Already there are mounting *bona fide* inquiries for rental of space in this superb industrial community. Business and labor of Kansas City are for it, and will be for every tenant.

WAR ASSETS ADMINISTRATION
OFFICE OF REAL PROPERTY DISPOSAL

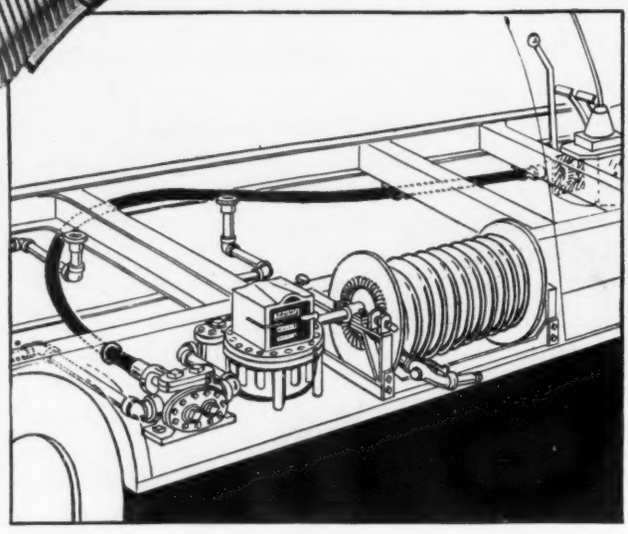
GOVERNMENT WAA SURPLUS

Post Office Box 1037, Troost and Bannister Road (95th Street), Kansas City, Missouri, Telephone: Delmar 3500

1038-T

THIS WISSCO WIRE *Speeds Power* AROUND CURVES

General Construction of Stow Flexible Shaft Core.



The facility with which the Stow Flexible Shaft operates around curves lends itself to a wide variety of applications involving transmission of power.

Because the strength and easy operation of the flexible shaft is dependent upon its core, the Stow Manufacturing Co. has established exacting standards for the wire used in core construction. The Wissco Shaft Wire used in Stow Flexible Shafts is a high carbon or low carbon, hard drawn, bright or liquor finish wire, designed to meet the manufacturer's rigid specifications for uniformity in size, tensile and stiffness.

Wissco Shaft Wire is but one of the many Wickwire Spencer specialty wires. Our 126 year experience, plus the fact that we operate our own open hearth furnaces and modern wire mills, enables us to supply anything you need in steel specialty wires, high or low carbon; round or shaped; in a wide variety of sizes, tempers, grades and finishes.

Wickwire Spencer metallurgists are ready to help solve your wire problems—to develop wire that best meets your particular requirements. Send your order or inquiry to Wickwire Spencer.

WISSCO *Wire*

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION · THE COLORADO FUEL AND IRON CORPORATION

WIRE SALES OFFICE—361 DELAWARE AVE., BUFFALO 2, N. Y.

GENERAL OFFICE—500 FIFTH AVENUE, NEW YORK 18, N. Y. · SALES OFFICES—BOSTON · CHICAGO · DENVER

PACIFIC COAST—THE CALIFORNIA WIRE CLOTH CORP., OAKLAND 6, CAL.

CF&I

How RED LEAD "PASSIVATES" METAL ... inhibits RUSTING

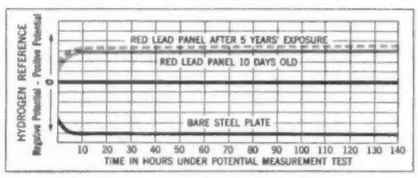
Research discloses sound reasons for Red Lead's long acceptance as the "standard" metal protective paint.

None is more important than Red Lead's ability to keep iron and steel in a "passive" state, in which the rusting process is held to a minimum.

As you know, unpainted steel, exposed to moisture, rapidly rusts. However, the same metal, under identical exposure conditions, remains "passivated," or rust-inhibited, when coated with Red Lead.

Proof of this is given in the graph at the right. It shows clearly the rust-inhibitive effect of Red Lead paint on steel, as contrasted with the rapid and continuous rusting of unpainted metal.

It is worth noting that, even after five years' exposure, the "passivating" power of Red Lead is still retained. Small wonder, then, that maintenance men think of Red Lead *first* when it comes to making metals *last*.


HYDROGEN REFERENCE
Negative Potential - Positive Potential
0
RED LEAD PANEL AFTER 5 YEARS' EXPOSURE
RED LEAD PANEL 10 DAYS OLD
BARE STEEL PLATE
10 20 30 40 50 60 70 80 90 100 110 120 130 140
TIME IN HOURS UNDER POTENTIAL MEASUREMENT TEST

Graphic Evidence of RED LEAD'S Protective Power

The non-corroding state of Red-leaded steel, as compared with unprotected steel, was measured electrically. A piece of unpainted steel was immersed in water. The iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential relative to hydrogen (see above graph).

However, when steel panels painted with Red Lead were immersed under the same conditions, iron and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

* * *

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including many of the fast-drying resin types.

Specify RED LEAD for ALL Metal Protective Paints

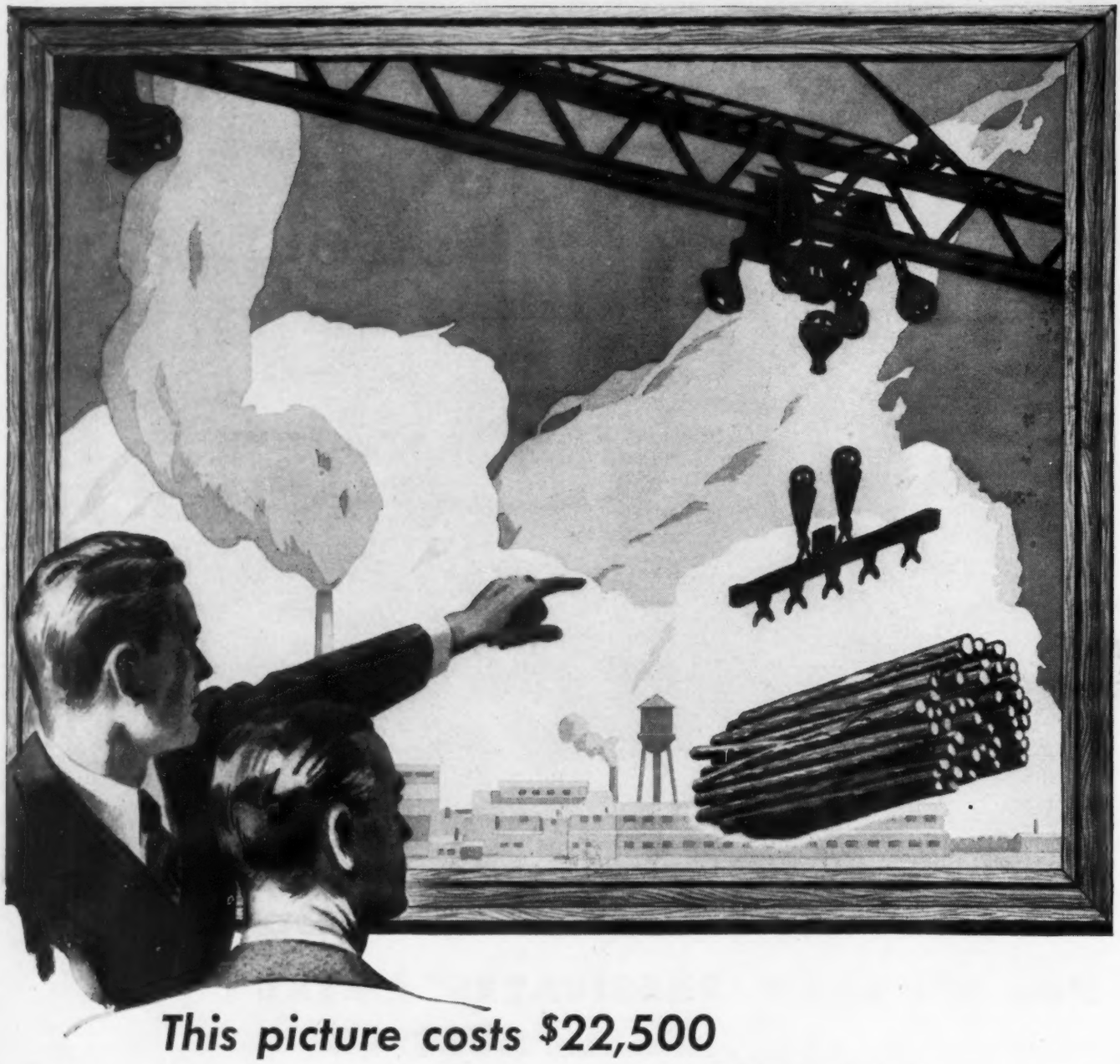
The rust-resistant properties of Red Lead are so pronounced that it improves any metal protective paint. So, no matter what price you pay, you'll get a better paint if it contains Red Lead.

* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.); Philadelphia 7 (John T. Lewis & Bros. Co.); Pittsburgh 30 (National Lead Co. of Pa.); Charleston 25, W. Va., (Evans Lead Division).

DUTCH BOY
Reg. U. S. Pat. Off.
RED LEAD



This picture costs $22,500 . . . should be $900 more

You may never have to handle pulpwood, but this is a splendid example of where false economy might prove costly.

Actually it's the pulpwood handling crane that costs $22,500—not its picture. But this mechanical giant couldn't lift a matchstick without the wire rope sinews that control its operation . . . Ordinary wire rope would cost about $750. For about $900 you could rig with the *best*—Preformed wire rope made of Improved Plow Steel.

When you buy an important machine make certain it comes equipped with Preformed wire rope. More and more machinery manufacturers are standardizing on Preformed for original equipment because it is the best. It's a money-saver because it lasts longer. Operators want it, because it's safer to handle.

WRITE FOR FREE COPY OF HELPFUL BOOK ABOUT PREFORMED

Address: PREFORMED WIRE ROPE INFORMATION BUREAU • 520 N. MICHIGAN AVENUE • CHICAGO 11

Ask your own wire rope manufacturer or distributor

HANDLES EASIER

PREFORMED WIRE ROPE

LASTS LONGER

More grinding . . . done faster! That's the story of Simonds Abrasive high speed resinoid bonded grinding wheels . . . especially efficient for rough snagging work in foundries and steel mills where fast stock removal at reasonable cost is the prime consideration.

Also used for high speed abrasive cutting-off operations and many precision finishing jobs such as roll grinding, saw gumming, disc grinding and surfacing with segments.

Send for our Grinding Wheel Data Book for complete information and specify SIMONDS ABRASIVE to your nearest Simonds Abrasive Distributor.

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"We Save up to 30% of Production Time

WITH WALKER-TURNER DRILL HEADS IN SPECIAL JIGS"... *Wright Aeronautical Corp.*

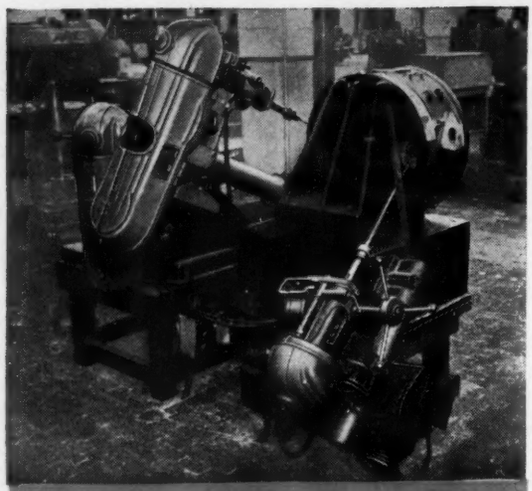
"To eliminate costly setup time, a number of small individual jig-drill combinations employing Walker-Turner standard drill units costing $100 to $400 have been installed.

"Housing sections of the Wright Cyclone engine require hundreds of holes of various depths, diameters and angles. With this installation the changing of jigs and fixtures becomes unnecessary.

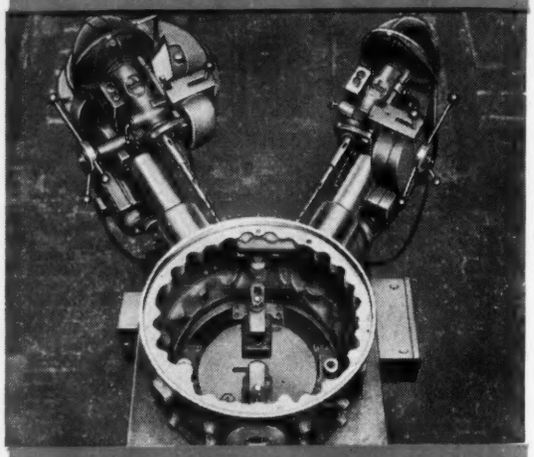
"PRODUCTION SCHEDULES ALLOWED AS MUCH AS 30% OF TOTAL OPERATION TIME FOR THIS SETUP PROCEDURE. This new method eliminates setup and the possibility of error is reduced.

"We now have more than 30 special jig-drill setups employing Walker-Turner Drill Heads in this plant all working to our complete satisfaction."

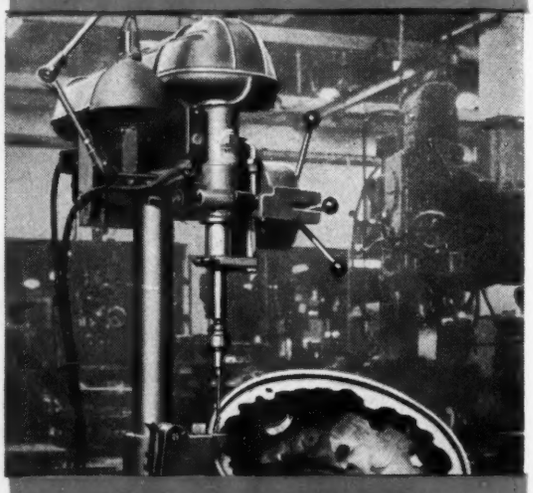
E. PRANGE, *Supervisor*
Process Engineering
Wright Aeronautical Corp.



Operating on the bottom of the workpiece, two Walker-Turner 20" Power Feed Drill Presses are used in this installation.



By placing two Walker-Turner 20" Power Feed Drill Heads in a horizontal position, loading of the cumbersome workpiece is greatly facilitated.



Two angular oil passages drilled into distributor pads with Walker-Turner 20" Power Feed Drill heads.

TWENTY-FIFTH YEAR
1922 1947

walker-Turner
COMPANY, INC.
PLAINFIELD, N.J.
U.S.A.

SOLD ONLY BY AUTHORIZED INDUSTRIAL MACHINERY DISTRIBUTORS 168

MACHINE TOOLS

DRILL PRESSES—HAND AND POWER FEED • RADIAL DRILLS • RADIAL SAWS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

THIS "PRAIRIE SCHOONER" OF 1947 IS Yoloy Built

LIKE its predecessor of a century ago, this Yoloy-built "Prairie Schooner" is on the road by the thousands.

The feature of this All Purpose Utility Trailer which appeals most to automobile dealers and their customers is its durability--a durability inherent in a product that is fabricated properly from tough, corrosion-resistant Yoloy steel--a durability that lasts through long, hard service.

Yoloy is Youngstown's high-tensile, low-alloy nickel-copper steel. Scores of fabricators use Yoloy because it combines extra strength and toughness with an unusual ability to resist corrosion and shock. They also like it because it forms easily and welds readily. These characteristics make Yoloy an ideal steel for products which must be light in weight, yet exceedingly strong, which must stand corrosive atmospheres or extremely low temperatures, which must give a long lifetime of useful service under highly adverse conditions.

Yoloy is manufactured in the form of plates, sheets, strip, bars, shapes, cold drawn bars, seamless and electric weld pipe. If you are not yet familiar with this versatile high-tensile steel, let our representative give you the facts.

Many All Purpose Utility Trailers are being shipped daily to dealers by the manufacturer. Both body and chassis are made of Yoloy. Hardwood side racks and canopy tarpaulin are furnished as optional equipment.

QUALITY V YOUNGSTOWN SERVICE

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

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STANDARDS and SPECIALS by the *Millions*

Simply Specify—

"SHINYHEADS" NC or NF Thread | **"HI-CARBS"** NC or NF Thread | **"SHINYLANDS"** Standard Thread

"SHINYHEADS"
America's Best Looking Cap Screw

Made of high carbon steel—AISI C-1038—to standards for full finished hexagon head cap screws. Heads completely machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Carried in stock.

"HI-CARBS"
Heat Treated Black Satin Finish

Made of high carbon steel—AISI C-1038. Furnished with black satin finish due to heat treatment. Hexagon heads die-made, not machined. Point machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots—less burrs. Flat and chamfered machine point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots—less burrs. Flat and chamfered machine point. Carried in stock.

SET SCREWS

Square head and headless—cup and oval point—case hardened. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered point. Nut end, oval point. Carried in stock.

"SHINYTHREADS"

AIRCRAFT ENGINE STUDS

Made of highest aircraft quality alloy steel, finished to extremely close thread and body tolerance, with precision rolled threads—both straight and step types.

CONNECTING ROD BOLTS

Made of alloy steel—heat treated—threads rolled or cut—finished to extremely close thread and body tolerances—body ground where specified.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

VALVE TAPPET ADJUSTING SCREWS

Hexagon head style—to blueprint specifications—hexagon head hard; polished if specified—threads soft to close tolerance.

STANDARDS carried by **LEADING DISTRIBUTORS**

SPECIALS furnished to **BLUE PRINT SPECIFICATIONS**

THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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• SEND FOR SAMPLES •

This is FeMn+

(STANDARD HIGH CARBON FERRO MANGANESE)

The Plus (+) Value in Ohio Ferro-Alloys Ferro Manganese stands for the uniform product furnished year after year and the prompt service rendered in its delivery.

In the future, as in the past, this plus value of Ohio Ferro-Alloys Ferro Manganese and other ferro-alloy products will be of real value to both purchasing and melting departments.

FERRO SILICON 50% - 75% - 85% - 90%
SPECIAL BLOCKING 50% FERRO SILICON
H. C. FERRO CHROMIUM • FERRO MANGANESE
BOROSIL • SIMANAL

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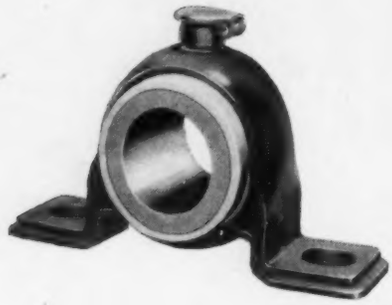
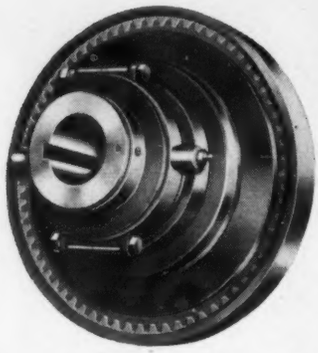
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma



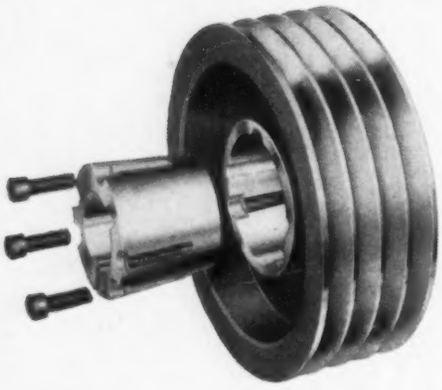
This is the BRONZOIL Bearing. Developed by Dodge for fan and blower service. A new and better transmission appliance.

U. S. Patent No. 1,931,055



This is the ROLLING GRIP Clutch. Developed by Dodge. No toggles. A new and better transmission appliance.

U. S. Patent No. 2,397,414



This is the TAPER-LOCK Sheave. Developed by Dodge. No flange. No collar. A new and better transmission appliance.

U. S. Patent No. 2,402,743

This is the Dodge Transmissioneer – who will tell you about new ways of transmitting power mechanically.

DODGE

of Mishawaka, Ind.

New equipment which helps cut costs, improve machine performance, increase production is offered to you by Dodge of Mishawaka. For detailed information about power transmission units to meet specific needs in your plant, or on your product, call the Transmissioneer, your local Dodge distributor. Look for his name in the classified telephone directory under "Power Transmission Equipment." A talk with him will prove profitable to you.

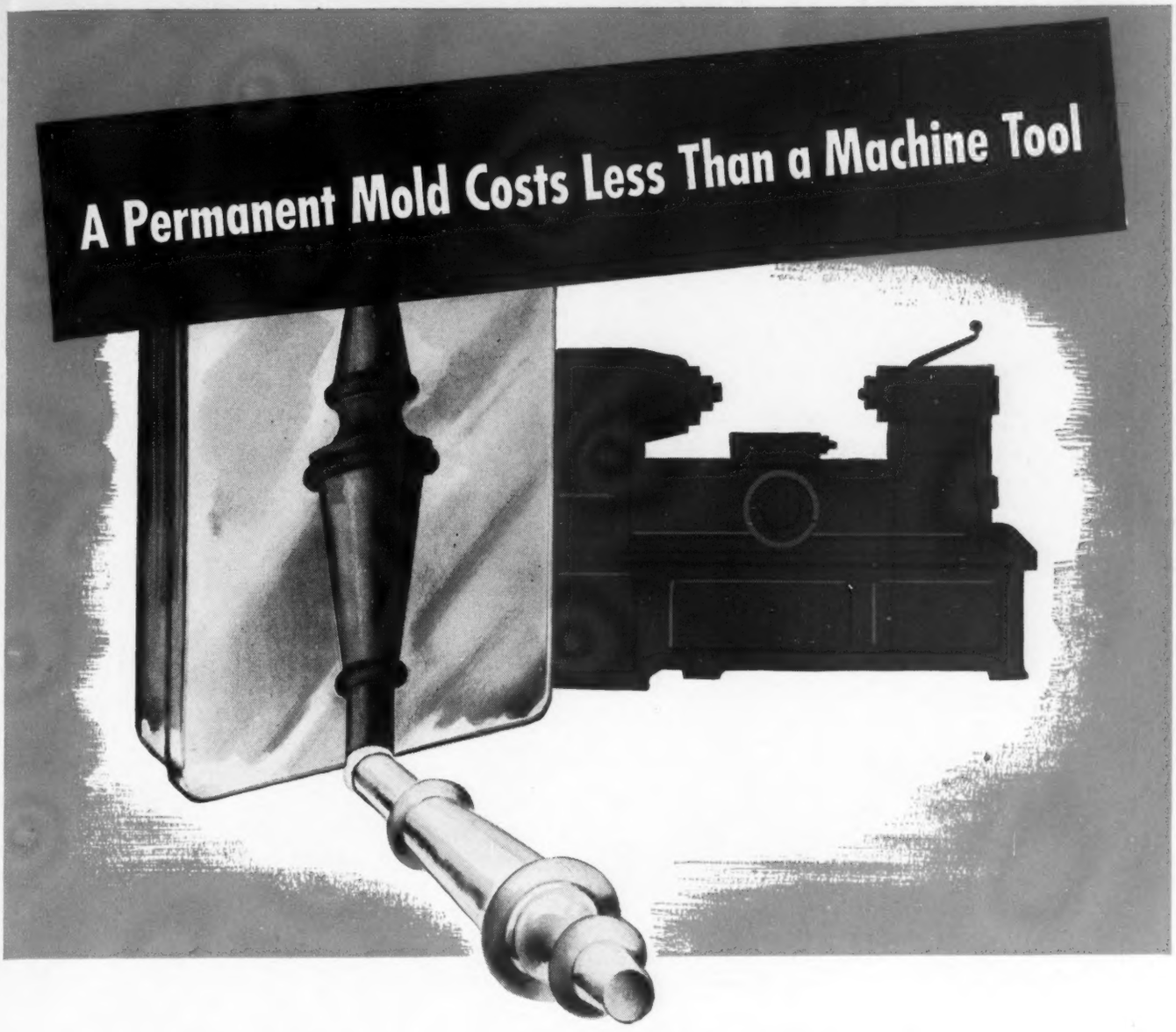
DODGE MANUFACTURING CORP., MISHAWAKA, IND.

Copyright, 1947, Dodge Mfg. Corp.

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

A Permanent Mold Costs Less Than a Machine Tool



And you get a BONUS in lightness!

Permanent-mold castings of American Magnesium do not require the time-consuming steps of rough machining, finish machining and finish grinding. Made to close limits, they eliminate the need for extra machine tools in your production line.

In addition, your product gains a bonus in lightness, for American Magnesium is 35% lighter than aluminum, 75% lighter than steel.

Give full consideration to the economies and the sales advantages offered by Permanent-Mold Castings of American Magnesium as you complete your designs. The 59 years of light-metal know-how of Aluminum Company of America will help you plan for their use. ALUMINUM COMPANY OF AMERICA, sales agent for American Magnesium products, 1721 Gulf Building, Pittsburgh 19, Pennsylvania.

MAGNESIUM MAZLO PRODUCTS

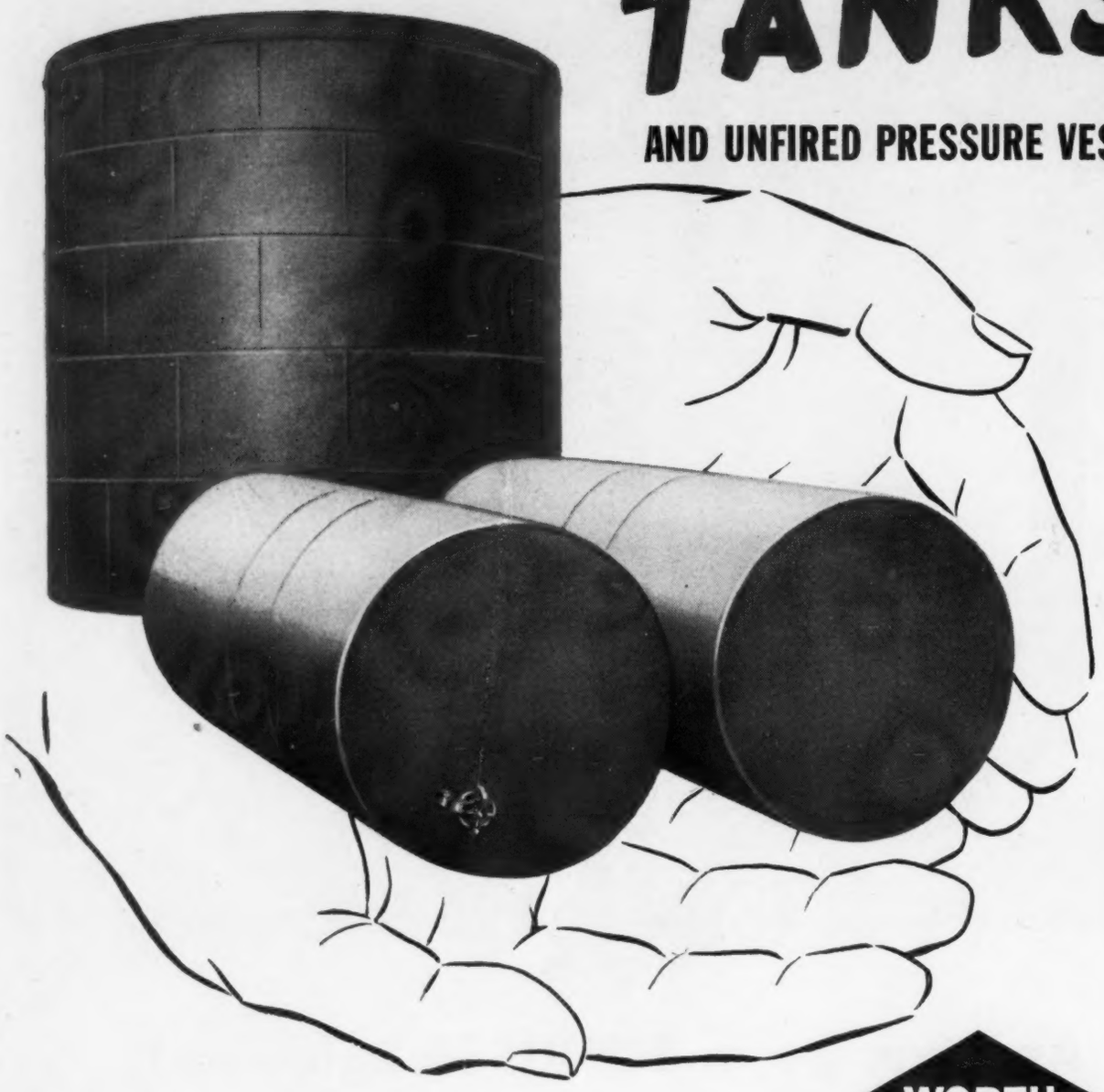
Reg. U. S. Pat. Off.

AMERICAN MAGNESIUM CORPORATION

SUBSIDIARY OF ALUMINUM COMPANY OF AMERICA

TANKS

AND UNFIRED PRESSURE VESSELS



WORTH

Rugged, durable tanks of steel that is easy to fabricate, perfect for welding or riveting. Quality steel—uniform, flawless and accurate in composition and structure—made to fit your own special requirements.

Flanged and Dished Heads from 9½" to 216" O. D.; in thickness from 3/16" to 4". Steel Plates up to 150" wide.

STEEL PLATES
FLANGED & DISHED HEADS

WORTH STEEL COMPANY • Claymont, Delaware

A High Return on INVESTMENT

Courtesy of
R. K. Le Blond Machine Tool Company

MACHINE TOOL SHOW
Chicago, Sept. 17-26
Booth No. 414

These sturdy machines with many automatic features, combined with simplified controls, concentrated on the head—save waste movement of the operator and much physical effort.

One constant speed motor drives the spindle and raises and lowers the arm—a simple, direct maintenance free drive.

Within their range, these highly productive, 9" column, 3 or 4-foot arm High-Speed All-Geared Super Service Radials give a high return on investment.

Write for detailed Bulletin R-21-B.

See our condensed catalog in Sweet's File.

RADIAL AND UPRIGHT SUPER SERVICE DRILLING MACHINES

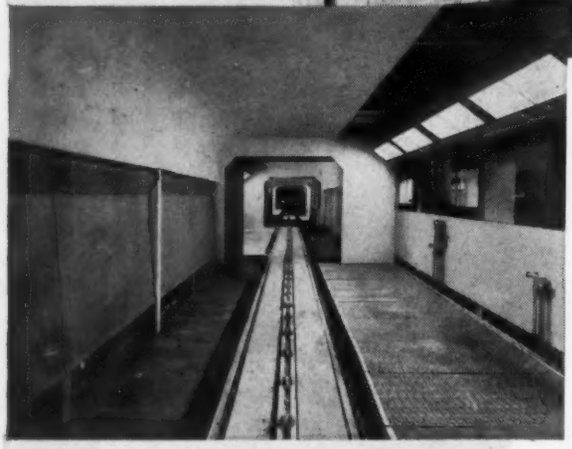
Equal Efficiency of Every Unit Makes the Balanced Machine

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT

Above: Mahon Multiple Tunnel-Type Automobile Body Ovens in One of the World's Finest Finishing Systems. At Right: Exterior of the Same Ovens showing Heating Units and Automatic Temperature Control Panels.



Interior of Mahon Hydro-Filter Spray Booths Designed for Automobile Body Production.

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Organic Finishes for Magnesium Alloys
Oxygen in Steelmaking
Controlling Parts Flow
Budgeting Industrial Lighting Costs

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 25 JUNE 23, 1947

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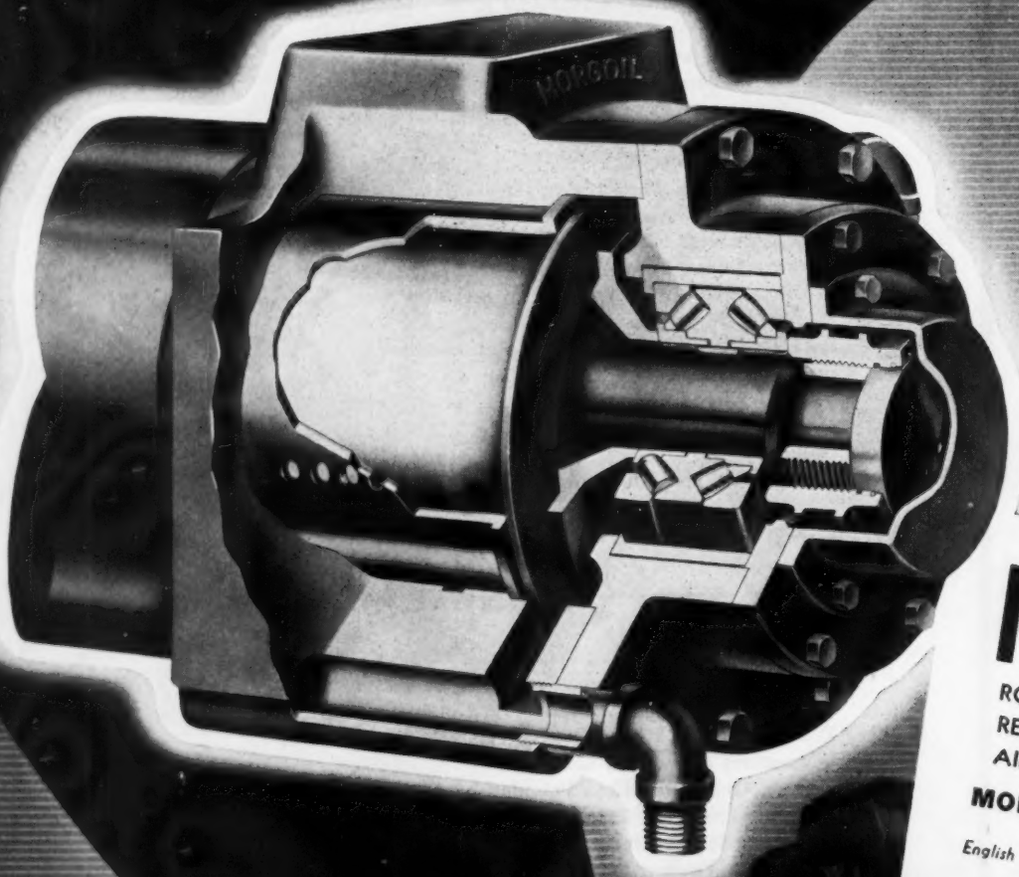

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the new are tried,
Nor yet the last to lay
the old aside."

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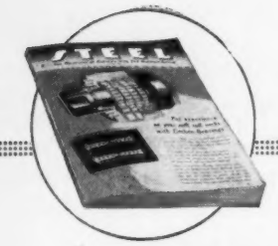


June 23, 1947

Selling the American System

Arthur H. Motley, president and publisher, Parade Publications, Inc., has been winning favorable mention for his program of public relations for industry. In numerous addresses he has been telling large audiences that while industry has learned how to sell its products, it has failed miserably in its attempt to sell the American industrial system to the people.

Last week he spoke to the silver anniversary conference of the National Industrial Advertiser's Association in Milwaukee. He made a distinct hit, largely because the methods he proposed for selling the American industrial system to the public are precisely the same methods advertisers employ to sell industry's products to consumers.

Mr. Motley stressed four essentials in selling the industrial system—research, market study, correct copy and a consistent campaign.

As for research, Mr. Motley would study the American industrial system just as manufacturers study their products. Find out its strong points and its weak points. "Sell" the strong points now and strengthen the weak points so that they can be "sold" as soon as they become strong.

Market study consists of finding out who can use the American industrial system. Concentrate on that segment of the public that least understands the system. It consists largely of employees and others who have been misinformed.

Third, use realistic copy. Do not use a stilted message signed by a company president that has been screened through legal talent. Instead seek out typical examples of employees who are proud of their jobs and who like the companies they work for. There are thousands of silent satisfied employees to each vociferous disgruntled employee. Tell the story of the majority who appreciate the benefits of the system under which they have been highly successful.

Finally, selling the American system cannot be accomplished by a short-term campaign. American manufacturers know they cannot sell their product by means of a one-time ad. Consistent long-range effort in public relations is just as important as consistent selling of the product. Mr. Motley said that the work of many public relations men is too much like that of firemen—they are called to the job after a conflagration has started. Good public relations work consists of preventing fires before they start.

Now that the leaders of one industry after another are appropriating millions in efforts to help the public understand the American industrial system, it would be a good idea to study the Motley proposals. They have much to commend them.

* * *

LABOR PRODUCTIVITY: Bureau of Labor Statistics has completed a study on trends in labor productivity that may be significant. It finds that the average number of man-hours required to build selected machine tools in 1945, the last war year, was 3.8 per cent above the corresponding figure for 1939.

This over-all figure probably is not too surprising. True, designs were frozen in 1945 and production was high so that there should have been important economies from the standpoint of labor input. However, labor turnover was high, much of the personnel was inexperienced and wartime shortages of material constituted a serious problem.

Possibly a more realistic criterion of labor productivity is to be found in the fact that the number of direct man-hours alone required to produce a machine tool (i.e., man-hours of non-supervisory wage earners engaged in productive machine operation and assembly work) declined 19.4 per cent between 1939 and 1943 and then increased 10 per cent between 1943 and 1945. Indirect man-hours

(OVER)

(supervisory, materials handling and maintenance) increased generally from 1940 through 1945.

It would be profitable to explore the reasons for the sharp reversal in the trend of productivity of direct labor that took place in 1943 and to determine whether they still remain as a bar to the increased productivity of labor in the present postwar period.

—p. 76

° ° °

BUY MORE CAUTIOUSLY: Reports from representative companies in the metalworking field indicate that while stocks on hand and deliveries of components such as motors, electrical equipment, castings, stampings, forgings, bearings, transmission units and bolts, nuts and rivets in general have improved during the past nine months, the situation still is spotty with wide variations as to the availability of specific items.

For instance, while a substantial majority of companies can get deliveries on weldments, stampings, belting and belt drives in less than 60 days, fewer purchasers can get 60-day delivery on castings, bolts, nuts, rivets, hydraulic transmissions and controls and air and hydraulic cylinders today than was possible last September. While deliveries of fractional horsepower motors are slightly easier now than they were nine months ago, only 8.6 per cent of buyers can get deliveries under 60 days at the present time.

The survey reveals increasing efforts on the part of buyers to balance inventories and to purchase on shorter schedules. Caution is more prevalent.

—p. 69

° ° °

JUNIOR ENGINEERS: At the semiannual meeting of the American Society of Mechanical Engineers held in Chicago last week President Eugene W. O'Brien reported the results of a survey among mechanical and electrical engineers as to their attitude toward labor relations legislation.

In answer to the question as to whether engineers should be exempted from coverage of the Wagner Act, 76 per cent voted in favor of exemption. Asked whether engineers should be covered by a new labor relations law, 54 per cent favored exclusion. Commenting on these returns, Mr. O'Brien said that while a majority is against inclusion in labor relations legislation, "a substantial minority, made up largely of younger men, wish to retain the right to bargain collectively."

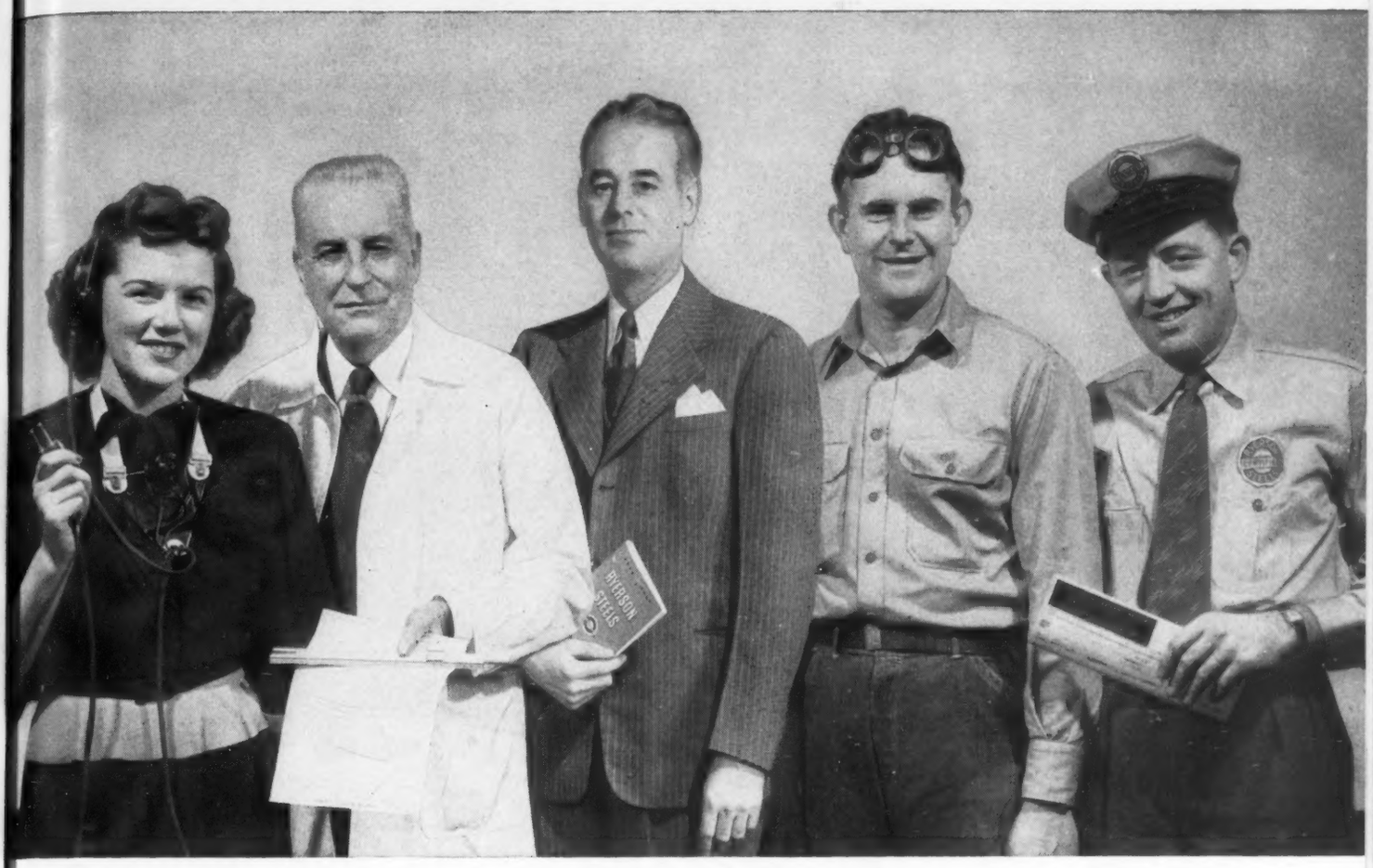
The returns raise the question as to whether industry generally is handling its relations with junior engineers as intelligently as should be. Perhaps there is room for marked improvement in this important relationship.

—p. 77

SIGNS OF THE TIMES: House Small Business Committee has recommended the "immediate rehabilitation and sale of the Federal Barge Lines to private operators." It is estimated an expenditure of $17 million for modernization to increase efficiency (p. 81) would reduce operating costs by 50 to 60 per cent. . . . At the peak of wartime activity in 1943 no less than 146 quicksilver mines were in operation in western states. Today only four are active (p. 82) due to the fact that the Spanish-Italian cartel has cut the price of mercury in the United States to $65 per flask. With tariff, this figures out at $84 a flask, delivered, New York. Domestic producers, committed to high labor costs, cannot compete at this level. . . . Ward's Automotive Reports estimates that gross income of the automobile industry of the United States and Canada for the first half of 1947, including wholesale prices for all car, truck and parts sales, will exceed $3.6 billion (p. 90), compared with $4.7 billion for all of 1941—the last prewar year of normal operations. . . . Steel Processing Co. has developed a rocker type oscillating furnace for converting scrap turnings into heavy steel melting stock. The furnace, occupying a floor space of 10 x 20 ft, can turn out 1½ tons of stock per hour at an operating cost of $3.60 per ton. The experimental plant at Cannonsburg, Pa., is accumulating a tonnage of the new product (p. 124) for the purpose of determining what percentage of it can be introduced into the scrap charge of an open hearth furnace advantageously. . . . It may interest industrialists to note that the Committee for Economic Development seems to have caught the fancy of the people who pass out news to the American public. CED press conferences attract an attendance of newspapermen, radio and press commentators and wire service representatives (p. 78) equal to that which turns out for the major news announcements by governmental spokesmen. . . . A Mexican company in Monterrey loads a completely assembled transport bus, except for tires and gas tank, on supporting dollies, applies a prime coat, and pulls the entire unit into a baking oven. The same procedure is followed for baking the finish coat. This method (p. 128) saves considerable time and handling effort. . . . Use of oxygen in open hearths on a large scale (p. 106) must await a larger supply of this important commodity.

E. L. Shaner

EDITOR-IN-CHIEF



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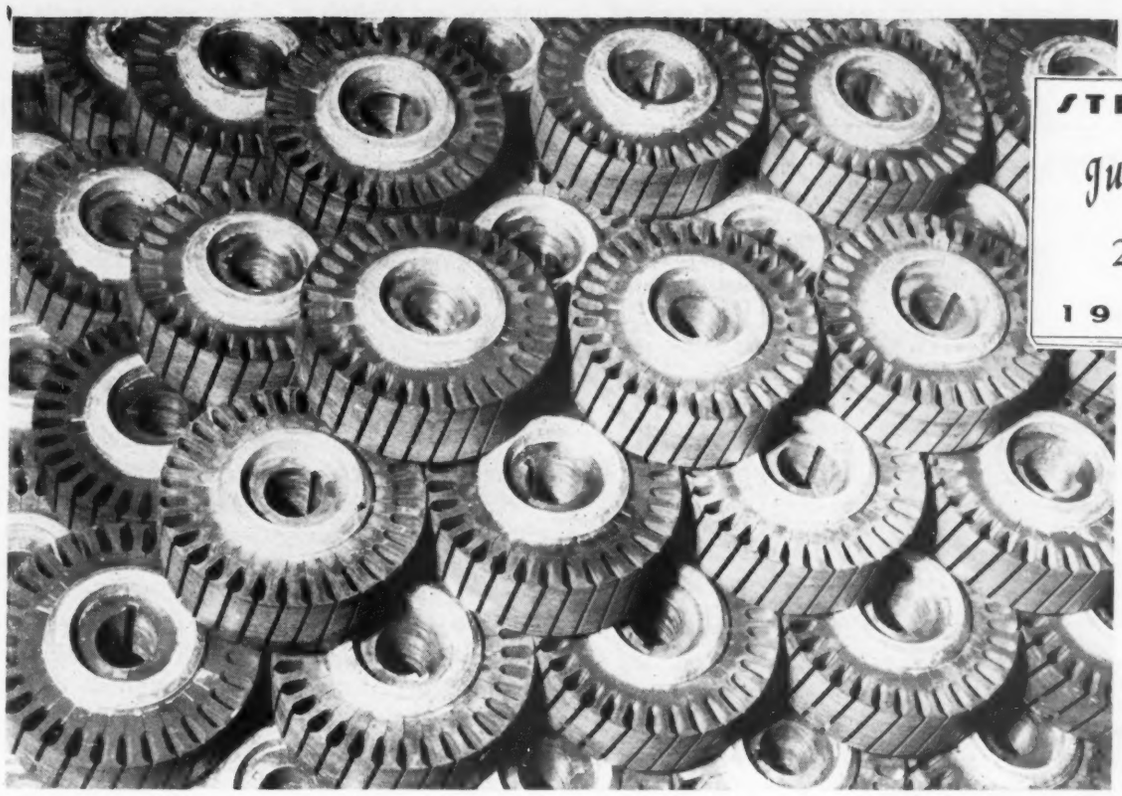


STEEL
June
23
1947

Component Inventories, Shipments Unbalanced

Stocks and deliveries of motors, electrical equipment, castings, stampings, fasteners and other parts generally improved but still are subject to wide variations. Buyers adopting more cautious attitude

DELIVERIES of many components used by the metalworking industry are improving and some companies are becoming more concerned about balancing and controlling their stocks than in obtaining deliveries.

Inventories and shipments of components generally are unbalanced. Some items, notably electric motors, are in short supply and often require many months for delivery. Other components now are in fairly good supply and can be obtained on short notice. The experience of individual companies also varies widely, some having good supplies of the critical items and others working on a hand-to-mouth basis.

This is the mixed picture revealed by scores of metalworking executives, representing diverse operations, questioned by the editors of STEEL.

Current reports by the metalworking companies, compared with those received in a similar study last September (see tables on pp. 70 and 71), show that overall deliveries of components are better and that stocks on hand have increased moderately.

The wide variations in availability of the various components make the overall situation unsatisfactory for many companies. A manufacturer, for example, may be able to obtain a sufficient quantity of stampings, weldments, nonferrous castings and belt drives, but his production may be held up by inability to obtain electric motors, electrical equipment or bolts and nuts.

Many companies are adopting a more cautious attitude in ordering those components which are becoming more plentiful. Some are reducing inventories. Some are buying on a shorter schedule. Some are attempting to schedule incoming deliveries so that stock is turned over every 30 days or some similar limited period.

This caution is more noticeable among buyers of components than among buyers of steel and other raw materials (STEEL, June 16, p. 57). The reason is obvious. A component which is not incorporated in a current model may become scrap, whereas unfabricated material can be used in future models or sold to be fabricated into other products. This particularly applies to stampings, castings, forgings, weldments, spring and wire shapes, gears and belt drives. Electric motors and electrical equipment, hydraulic transmissions and bolts, nuts and rivets are more standardized and cause less concern as inventories mount.

Metalworking companies reporting to STEEL say that fairly early deliveries can be obtained on

A SPECIAL REPORT TO INDUSTRY

stampings, nonferrous castings, weldments and belting and belt drives. Deliveries are most extended on electric motors and electrical equipment, cylinders, hydraulic transmissions and controls and bolts, nuts and rivets.

Smallest inventories are in stampings, nonferrous castings and weldments. Largest stocks are in cylinders, forgings, bearings and hydraulic transmissions and controls.

Most extended delivery promises encountered by component buyers are for electric motors. More than 25 per cent of the companies say motor deliveries extend 12 months and more. The situation is most acute in the fractional horsepower sizes for which about 32 per cent of buyers must wait a year or longer.

Fewer than 10 per cent of the buyers are able to obtain motors of any size in less than 60 days. The bulk of deliveries now are promised in from two to 12 months (see accompanying charts).

Both deliveries and inventories of motors, all sizes, have improved since last September.

Electrical equipment—solenoids, relays, switches, resistors, control instruments, etc.—is subject to extended deliveries, although both delivery promises and inventories have improved in the past nine months. One-third of metalworking companies now have a 60-day supply of such equipment and one-fifth can obtain deliveries within two months. About two-thirds can obtain the equipment in from two to six months.

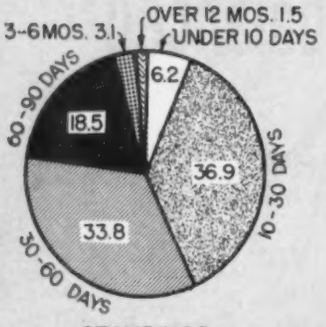
Bolts, nuts and rivets are difficult to obtain and three

INVENTORIES—SEPTEMBER, 1946-JUNE, 1947

Question: What is your current inventory position on each of the products listed? Percentage of plants having supplies for:

	Under 60 Days		Over 60 Days	
	Sept. 1946	June 1947	Sept. 1946	June 1947
Stampings	87.8	76.9	12.2	23.1
Forgings	52.8	53.1	47.2	46.9
Castings (Steel, G.I., Mall.)	80.7	70.5	19.3	29.5
Castings (Nonferrous)	76.3	77.4	23.7	22.6
Castings (Die)	61.5	61.8	38.5	38.2
Weldments	71.4	81.0	28.6	19.0
Spring and Wire Shapes	65.2	54.9	34.8	45.1
Bolts, Nuts, and Rivets	68.6	64.8	31.4	35.2
Bearings	50.9	53.2	49.1	46.8
Belting and Belt Drives	60.6	69.3	39.4	30.7
Couplings	56.2	68.8	43.8	31.2
Gears and Gear Drives	68.2	63.2	31.8	36.8
Hydraulic Transmissions & Controls	57.1	50.0	42.9	50.0
Cylinders (air and hydraulic)	76.4	44.4	23.6	55.4
Electric Motors (fractional)	76.4	64.3	23.6	35.7
Electric Motors (1-5 hp)	72.8	53.2	27.2	46.8
Electric Motors (over 5 hp)	57.1	58.0	42.9	42.0
Electrical Equipment (solenoids, relays, switches, resistors, control instruments, etc.)	73.7	66.7	26.3	33.3

INVENTORIES



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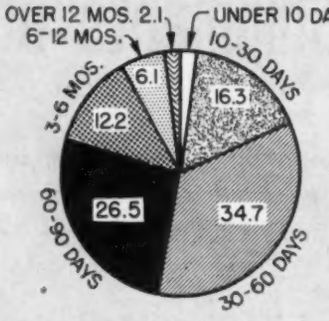

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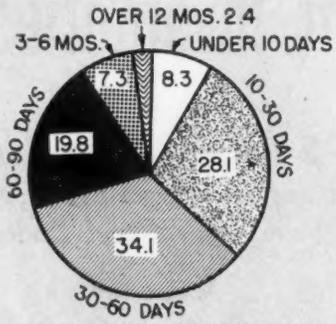

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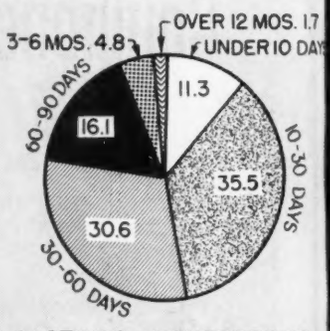

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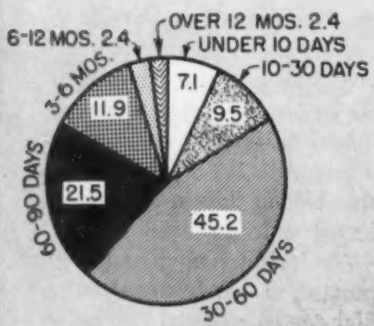
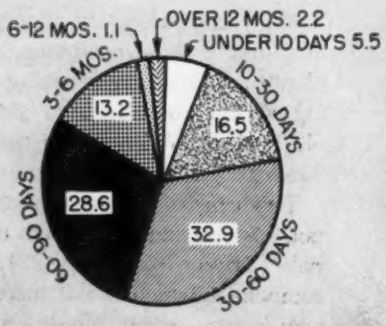
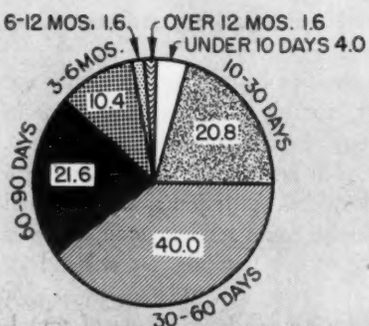


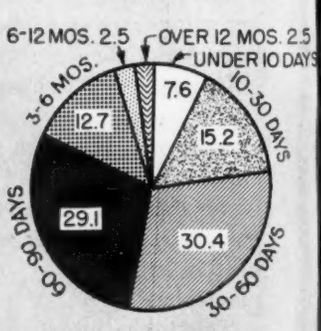
CASTINGS, DIE



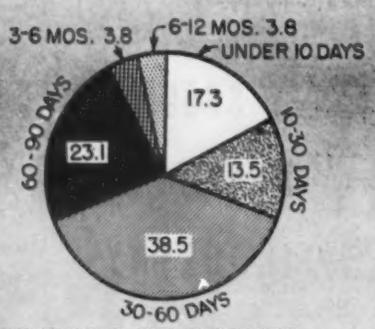
SPRINGS & WIRE SHAPES



BOLTS, NUTS, RIVETS



BEARINGS



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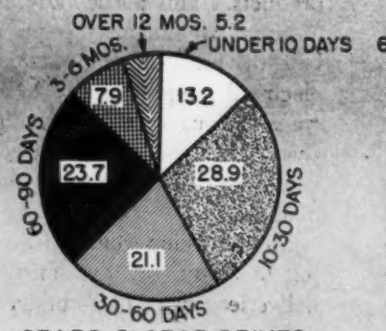
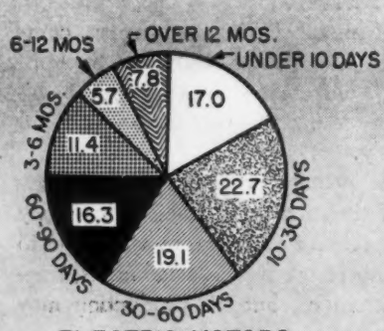
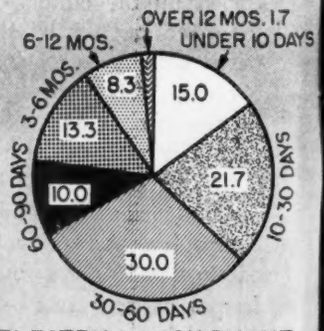


GEARS & GEAR DRIVES



ELECTRIC MOTORS



ELECTRICAL EQUIPMENT

fourths of users cannot get delivery in less than two months. Inventories have changed little from last September, 65 per cent of consumers having less than 60 days' supply.

Deliveries of cylinders and hydraulic transmissions and controls continue extended. Ninety per cent of companies must wait 60 days or more for hydraulic controls and approximately the same period for cylinders. Only about half the companies have 60-day inventories.

Stampings show a moderate improvement, both in stocks and deliveries, although the supply is not yet easy. The pinch comes in the inability of the stampers to obtain sufficient steel and some buyers of stampings are supplying steel to stampers to obtain early deliveries.

Less than one-fourth of metalworking companies using stampings have a two-month supply. Sixty per cent are able to obtain deliveries within 60 days.

Forging inventories are down slightly from last September, although deliveries show a modest betterment.

Ferrous castings continue tight, but nonferrous castings and die castings are considerably easier. The shortage of pig iron is the primary cause for the scarcity of malleable and gray iron castings. Seventy per cent of users have less than a 60-day stock of ferrous castings and less than half can obtain delivery within two months.

Nonferrous castings are promised for delivery within 60 days to 82.5 per cent of users. Die castings can be ob-

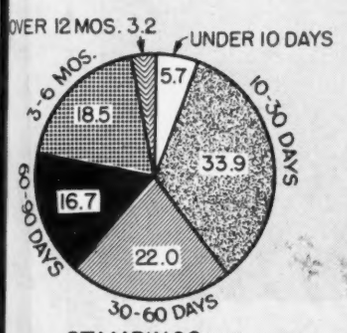
(*Please turn to Page* 176)

DELIVERIES—SEPTEMBER, 1946-JUNE, 1947

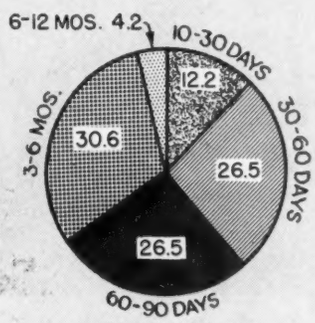
Question: What are the earliest delivery dates now promised by your regular suppliers? Percentage of plants promised delivery in:

	Under 60 Days		Over 60 Days	
	Sept. 1946	June 1947	Sept. 1946	June 1947
Stampings	56.1	61.6	43.9	38.4
Forgings	30.1	38.7	69.9	61.3
Castings (Steel, G.I., Mall.)	53.5	48.8	46.5	51.2
Castings (Nonferrous)	60.6	82.5	39.4	17.5
Castings (Die)	50.0	60.5	50.0	39.5
Weldments	55.6	93.8	44.4	6.2
Spring and Wire Shapes	44.2	53.2	55.8	46.8
Bolts, Nuts and Rivets	41.5	27.0	58.5	73.0
Bearings	23.3	34.4	76.7	65.6
Belting and Belt Drives	53.9	73.9	46.1	26.1
Couplings	43.8	60.0	56.2	40.0
Gears and Gear Drives	21.7	41.6	78.3	58.4
Hydraulic Transmissions and Controls	12.5	10.0	87.5	90.0
Cylinders (air and hydraulic)	28.6	12.4	71.4	87.6
Electric Motors (Fractional)	3.1	8.6	96.9	91.4
Electric Motors (1-5 hp)	3.1	9.8	96.9	90.2
Electric Motors (over 5 hp)	0	8.4	100.0	91.6
Electrical Equipment (solenoids, relays, switches, resistors, control instruments, etc.)	14.3	20.7	85.7	79.3

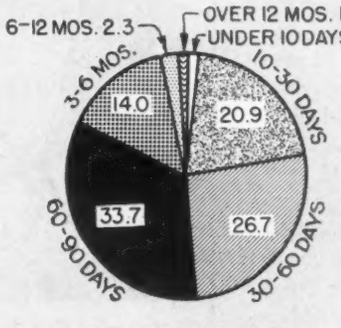
DELIVERIES



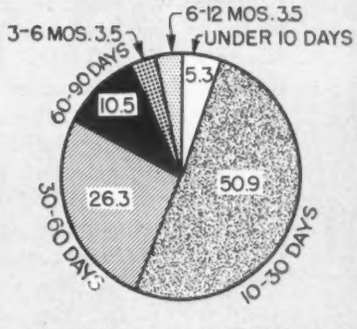
STAMPINGS



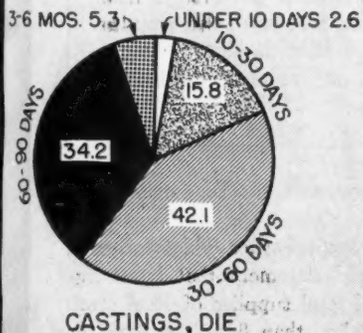
FORGINGS



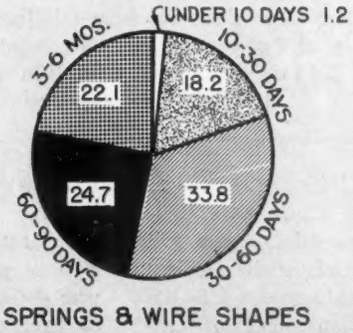
CASTINGS, FERROUS



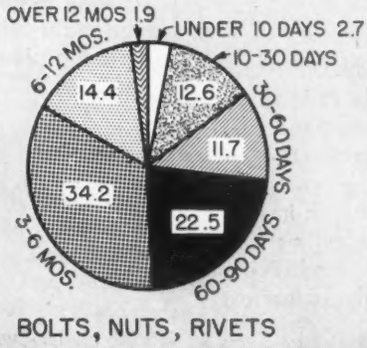
CASTINGS, NONFERROUS



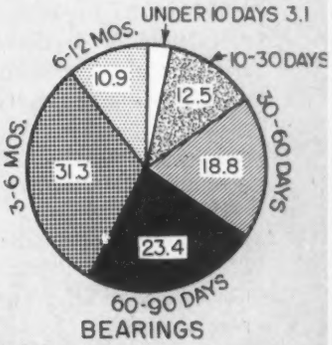
CASTINGS, DIE



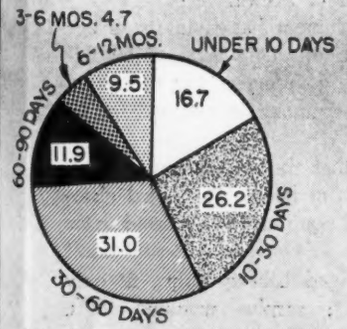
SPRINGS & WIRE SHAPES



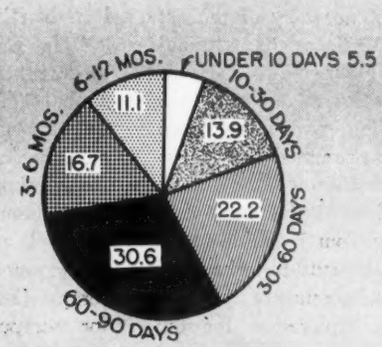
BOLTS, NUTS, RIVETS



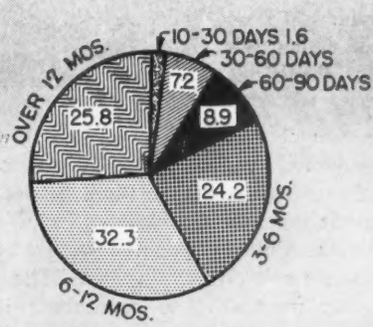
BEARINGS



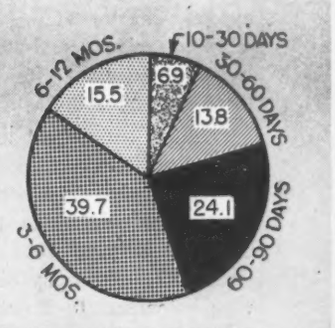
BELTING & BELT DRIVES



GEARS & GEAR DRIVES



ELECTRIC MOTORS



ELECTRICAL EQUIPMENT

Steel Export Control Extension Urged

Domestic users' supply difficulties attributed in part to large shipments abroad. Controls due to expire June 30. Steel shortage probe resumed

WASHINGTON

STEEL export situation is "out of control," Sen. Edward Martin, chairman of Steel Subcommittee of the Senate Small Business Committee investigating the steel shortage, last week told a Senate Judiciary Subcommittee considering extension of export controls due to expire June 30.

Appearing before the Judiciary Subcommittee in his capacity as chairman of the Steel Subcommittee, Senator Martin said: "Export controls on steel should be continued for at least another 12 months, and should be reviewed at that time to determine the pressure of domestic demand."

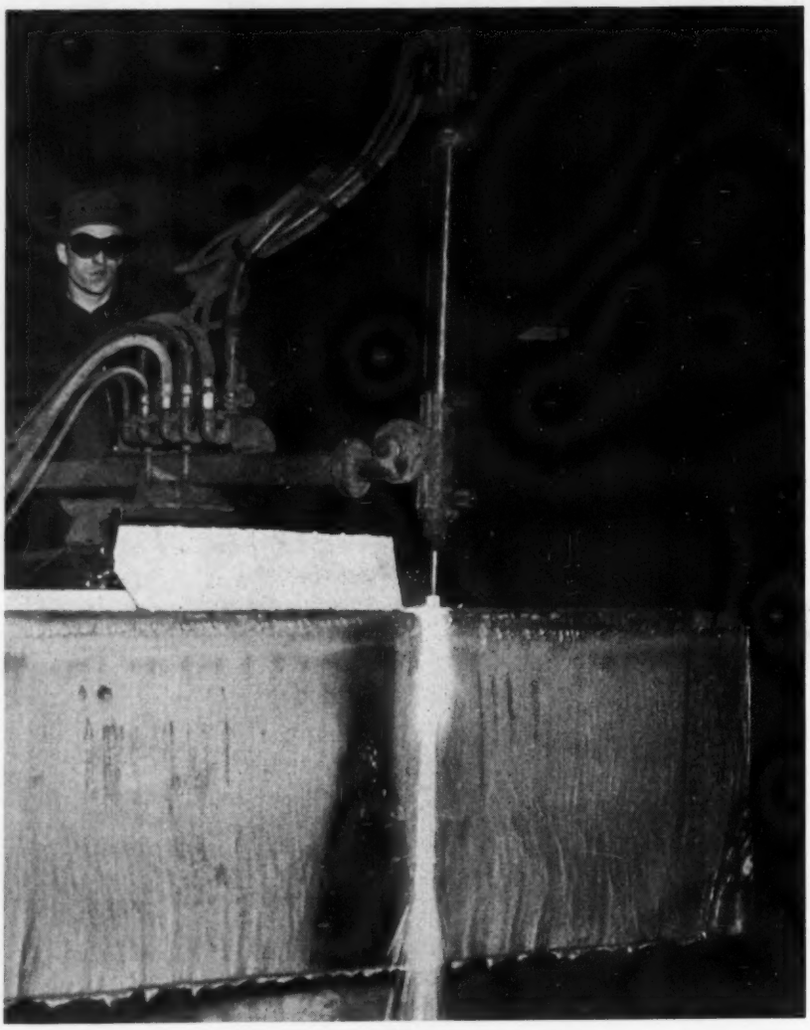
Stating attention of the Steel Subcommittee was called to the export situation by complaints from small manufacturers and steel users who blamed their supply difficulties on large shipments of sheet steel going abroad, Senator Martin was particularly critical of unrestricted exports which he said were allowed to move to Canada for manufacturing purposes there, under the so-called "Hyde Park" agreement made during the war between the late President Roosevelt and Prime Minister MacKenzie-King of Canada; also of steel pipe shipments to Latin American countries.

The senator urged that the entire Export Control Act be drastically tightened, and particularly that an immediate review be made of the Hyde Park agreement by responsible government agencies, looking to establishing export controls on steel going to Canada.

He also called for a "thorough investigation" of the qualifications and methods of operation of Export Control Policy Committee, which group determines export controls.

Urging retention of controls on steel exports, Senator Martin said: "To remove controls on steel would undoubtedly open the flood-gates for the highly lucrative export market."

Pointing out that in the case of steel pipe, Brazil, Argentina, Venezuela and Russia are the chief recipients, Senator Martin told the Judiciary Subcommittee that "it is not probable the United States will secure any oil as a result of pipe shipments to Russia, nor for that matter, any other trade or economic considerations."



BUILDING ATOM-SMASHER: Carnegie-Illinois Steel Corp. worker operates a water-cooled oxyacetylene torch to make a 31¼-in. cut through a 195-ton forging produced for the construction of Harvard University's new cyclotron. The two huge slabs cut from this forging will form the circular pole top pieces for the atom-smasher. Six ingots 8 ft in diameter, weighing from 195 to 258 tons each, were poured in special molds to create the steel parts for the cyclotron

It is generally expected Congress will approve export controls under an act that has been favorably reported to the House earlier, with an amendment requiring a review of necessity of the act before Dec. 31, 1947, or its termination at that time, otherwise.

Senator Martin's investigation of the steel supply situation, which had been recessed June 6, was resumed last Thursday with representatives of the American Iron & Steel Institute, and other witnesses, including Tom J. Smith, president, Pressed Metal Institute, scheduled to testify. The subcommittee planned to concentrate its exploration for the immediate present on the steel scrap shortage.

Senator Martin earlier told the Senate in a prepared statement that latest figures showed total supplies of steel scrap on hand at less than 3 million tons, or less than half of prewar level.

"The government has it in its power to cure much of this shortage," he declared. "The government has the scrap. But the government is not making it available."

Charging that the government is paying thousands of people "to hoard obsolete tools and equipment," he listed these main sources of government-held steel scrap: Damaged Liberty ships, fit only for scrapping; surplus machine tools,

either obsolete or so specialized for war use as to have no current purpose; war material owned by the government either rusting abroad, or under care of foreign civilian employees of Army or Navy.

The shortage of steel scrap will probably force many open hearth furnaces in Pennsylvania and elsewhere to shut down this fall and winter, he declared.

He charged that an order to ships returning in ballast from abroad to load surplus war goods or other scrap or ballast, has been dropped. Scrapping of Liberty ships, he added, also "has bogged down."

Besides obsolete and useless machine tools, he declared, there "is the matter of great quantities of metal in this country which the armed forces have not yet declared surplus, including, he said, thousands of tanks which "will be obsolete before another war."

Seek More Steel To Avert Threatened Oil Shortage

Interior Secretary Krug's office has set in motion a drive for more steel to prevent a liquid fuels shortage next winter. The Oil & Gas Division of the Interior Department last week recommended steel be made available immediately for a 40-mile 20 or 22-in. pipeline in Saudi Arabia to the Persian Gulf, and also for a number of 8 to 16-in. comparatively short lines to connect existing lines in Texas and mid-continent fields.

At the same time, the Office of Defense Transportation started a study of the recommendation of its Petroleum Industry Committee that 4000 high-pressure tank cars and 7500 low-pressure tank cars be delivered by the carbuilders over the next 14 months.

ODT's Petroleum Industry Committee recommends enlarging present tank car capacity to 900 monthly. ODT hopes to develop enough information by this midweek to determine whether demand for tank car steel can be supplied by diverting some tonnage previously allocated for freight car construction.

Last week's meeting in Secretary Krug's office was told that no shortage of gasoline and no serious shortage of fuel oil will develop next winter if the following hopes materialize: (1) A substantial part of the proposed pipeline and tank car program is carried out; (2) wage discussions between tanker operators and crews do not result in a strike; (3) there is no strike of refinery workers this year; (4) Congress authorizes the Maritime Commission to charter tankers for oil shipments after June 30; (5) more idle American tankers can be sold for foreign registry so foreign operators can use them to bring foreign oil here.

Says Seaway Would Retard Progress In Low-Grade Ore Beneficiation

AN ARGUMENT that construction of the St. Lawrence Seaway would delay installation of equipment to beneficiate low grade Lake Superior iron ores and imperil America's ore supply in the event of another emergency is being studied by the Senate Foreign Relations subcommittee.

Alexander C. Brown, president, Cleveland Cliffs Iron Co., Cleveland, assured the committee that the Lake Superior iron ore industry will be able to produce large tonnages of ore for an almost unlimited time by concentrating taconite and jasper. All the major producing companies are working on projects to beneficiate the low grade ore, against the time when the high grade ore runs out.

However, Mr. Brown told the committee, if the seaway is built and cheap foreign ore is imported in large quantities, the ore mining companies will be loathe to invest millions of dollars in expensive beneficiation machinery.

Earlier, W. Averill Harriman, Secretary of Commerce, had testified that as much as 40 million tons of foreign ore would be shipped through the proposed St. Lawrence waterway annually.

"It would not take many millions of tons of iron ore produced by cheap labor and transported in foreign ships to seriously disturb market conditions for Lake Superior iron ore," Mr. Brown said.

"Furthermore, the uncertainty which the St. Lawrence project would inject into the iron ore situation would tend to delay the taconite program.

"As producers of iron ore from the Lake Superior region, who expect to keep on producing iron ore, and eventually produce high grade concentrate from taconite and jasper as well, we see in the St. Lawrence waterway only a threat to the normal expansion and development of our industry, to the shipping dependent on it, and to the whole economy of the Great Lakes region.

"The vast capital required for taconite and jasper concentration plants—estimated at $10 to $15 million per million tons of product—probably would not be forthcoming until the effect of the St. Lawrence waterway upon the iron and steel industries were revealed by operation of the project over some years."

Present, Past and Pending

■ BROWN INSTRUMENT ON FIRM PRICE BASIS

PHILADELPHIA—Despite increasing labor and material costs, Brown Instrument Co. has reaffirmed a firm price basis in the sale of all its products.

■ STUDY EQUIPMENT NEEDS FOR ORE BENEFICIATION

SCHENECTADY, N. Y.—General Electric Co. engineers are turning their attention to the electrical equipment needs of iron ore companies planning to beneficiate low-grade iron ores.

■ RENEGOTIATION ACT RULING AVOIDED BY HIGH COURT

WASHINGTON—United States Supreme Court last week refused by an 8 to 1 vote to rule on the contention of the Aircraft & Diesel Equipment Corp., Chicago, that the war profits renegotiation act is unconstitutional.

■ OIL, GAS INDUSTRY TAKES 26% OF PIPE

NEW YORK—The oil and gas industry received 26 per cent of 1946 pipe and tubing output, according to the American Iron & Steel Institute. Shipments to the oil and gas industry amounted to 1,225,425 tons and total production was 4,633,231 tons.

■ WASHER, IRONER SALES HIT NEW HIGHS

CHICAGO—Sales of household washers and ironers in April hit new highs, according to figures compiled by American Washer & Ironer Association. Domestic washer sales were 319,969, compared with 290,397 in March, and 104,296 in April, 1946. Ironer sales were 51,409 in April, compared with 42,442 in March and 11,898 in April, 1946.

■ WARNER & SWASEY TO MAKE WEAVING MACHINE

CLEVELAND—Broadening its production of machinery for the textile industry, Warner & Swasey Co. has announced plans for manufacturing an American version of the Swiss Sulzer weaving machine. Five pilot models are expected to be completed by the end of the year.

Substantial Progress Recorded in Standardizing Testing Methods

Advance has been particularly rapid since the war. Half of present standards and tentatives are for test methods and definitions, many of which form basis for business transactions representing bulk of manufactured products

THAT standardization of methods of testing has progressed substantially in the postwar period was evident in proceedings and committee meetings at the 50th annual meeting of the American Society for Testing Materials in Atlantic City, N. J., June 16-20.

In none of the hundreds of materials covered has the advance been more noteworthy than in metals.

More than 1400, or about half, of the present standards and tentatives are for test methods and definitions, many forming the basis for business transactions representing the bulk of the manufactured products of the nation. One of the most important standards today covers verification of testing machines, Arthur W. Carpenter, B. F. Goodrich Co., Akron, O., and retiring president of the ASTM, declared.

The Atlantic City meeting was attended by 1500. Next year's meeting will be held in Detroit.

F. B. Quinlan, General Electric Co., Schenectady, N. Y., was awarded the Richard L. Templin award for his paper on "Pneumatic Fatigue Machines," published in the 1946 proceedings.

Discuss Speed in Testing

Among the important round table discussions was one on the speed of testing, a preliminary step toward a formal symposium on the subject next year. While progress in testing of materials has been outstanding, it was brought out that numerous problems remain to be answered, including the need for research on the property of hardness and its measurement, fundamental nature of adhesion, the mechanism and measurement of abrasive wear.

The pressure for specifications, said Mr. Carpenter, may be understood when the need of industry for uniform materials in mass production is appreciated.

New tentative specifications for hot-rolled strip of structural quality and for alloy steel rounds suitable for oil quenching to end quench hardenability requirements were proposed by Committee A-1 on steel. Strip specifications, open hearth or acid bessemer, cover the following thicknesses and widths: 0.2299 to 0.2031 in. in thickness, in widths 6 to 12 in.; 0.2030 to 0.0568 in. in thickness, in widths 12 in. and under; 0.0567 to 0.0344 in. in thickness, in widths 6 in. and under; 0.0343 to 0.0255 in. in thickness, in widths 3½ in. and under.

Chemical composition requirements proposed are: Open hearth, carbon max 0.25, phosphorus max 0.04, sulphur max 0.05, copper, when copper steel is specified, min 0.20; acid bessemer, carbon max 0.10, phosphorus max 0.11, sulphur max 0.06, and copper 0.20 min.

In tensile properties strip, commercial grade, would conform to the following, subject to bend test: Tensile strength, Grade A 48,000 psi min, grade B 52,000 psi, Grade C 55,000 psi, with yield point min 25,000, 30,000 and 33,000, respectively.

Permissible camber in hot-rolled carbon strip not to exceed the following is recommended: Wider than 1½ in., ¼ in. in 8 ft; 1½ in. and narrower, ½-in. in 8 ft.

In its report the committee on magnetic properties set forth tentative general specifications for flat-rolled electrical steel, proposed a method of test for permeability of paramagnetic materials and discussed aging of materials at higher temperatures.

The committee on wire for electrical conductors recommended three revisions in standards which largely concern methods of gaging diameters. These changes, the committee pointed out, recognize present day wire-drawing practices and equipment which reduce the importance of diameter gaging.

The committee on electrical heating, resistance and related alloys recommended new proposed methods for measuring residual stress in metal-to-glass seals and testing fine round and flat wires for electronic devices. In measurement of residual stress the committee advocated utilization of a polariscope or polarimeter as means of measurement. The committee, in regard to testing fine round and flat wires, advances methods which cover wire 0.010 in. and smaller in diameter or thickness.

The committee on die-cast metals and alloys made several recommendations for changes in specification on magnesium-base alloy die castings which included the proposal that the copper requirement for alloy AZ91 be changed from "0.05 max" to "0.10 max" per cent. A special research subcommittee has been set up which will do work on die-casting processes.

Concerning light metals and alloys, cast and wrought, the committee on the subject presented a determination of elongation of sand-cast light alloy test bars in which it concluded that present specifications are satisfactory which require that elongation in 2 in. be measured to only 0.5 per cent in 2 in. The committee also proposed tentative specifications for aluminum and aluminum-alloy extruded bars, rods and shapes and specifications for aluminum and aluminum-alloy sheet and plate for use in pressure vessels.

The committee on electrodeposited metallic coatings recommended that all its specifications be contained in their present status without revision pending results of further research currently being carried on by the committee, the Research Committee of the American Electroplater's Society and others.

Technical Papers Summarized

Supplementing the committee reports were several technical papers by individual authors.

William H. Hoppmann II, senior mechanical engineer, Material Laboratory, Navy Yard, Brooklyn, N. Y., in a paper on the velocity aspect of tension-impact testing reviewed the work done by various investigators of the velocity aspect of tension-impact testing and, in particular, described the Guillotine Impact Testing Machine provided by the Navy at the Brooklyn Yard for the study of the effect of moderately high velocities on the impact resistance of materials and minor structural elements.

In a paper on intercrystalline cohesion and the the stress-rupture test, H. H. Bleakney, associate research engineer, National Research Council of Canada, Ottawa, Ont., Canada, presented the evidence bearing on causes of intercrystal-

NEW ASTM OFFICERS

T. A. Boyd, head of the fuel department of Research Laboratories Division of General Motors Corp., is new president of the ASTM. Vice president is J. G. Morrow, metallurgical engineer, Steel Co. of Canada, Hamilton, Ont.

New directors include: T. S. Fuller, General Electric Co., Schenectady, N. Y.; Everett G. Hamm, John A. Manning Paper Co. Inc., Troy, N. Y.; J. J. Laudig, Delaware, Lackawanna & Western Railroad, Scranton, Pa.; H. L. Maxwell, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.; and Louis J. Trostel, General Refractories Co., Baltimore.

line failure of metals when stressed at elevated temperatures. Existing theories of intercrystalline cracking were stated and analyzed.

W. A. Wesley, assistant director, Research Laboratory, International Nickel Co., Bayonne, N. J., described a system for rating the results of outdoor atmospheric exposure tests of chromium-plated finishes with a nickel or nickel-copper undercoat.

H. A. Pray, Battelle Memorial Institute, Columbus, O., also investigated this same field and discussed the function of cathodic electrodeposited metallic coatings used for purely protective purposes, and described the way in which they deteriorate on weathering.

Erle I. Shobert II, Stackpole Carbon Co., St. Marys, Pa., discussed welding of electrical contacts. He described the development by ASTM of a machine to test the properties of contact materials and developed a formula to show the relationship between the limiting current on this machine and the physical properties of contact materials.

Carlton H. Hastings, physicist at Watertown Arsenal, Watertown, Mass., reported on a new type of magnetic flaw detector, which was developed as the result of an attempt to find a practical inspection test method, including instrumentation, for the inspection of the bore of ferrous tubes or cylinders.

Fatigue Test Discussed

G. R. Gohn and W. C. Ellis, members of technical staff, Bell Telephone Laboratories Inc., New York, described the results of a series of fatigue tests in bending on two nonferrous materials in strip form under conditions of unsymmetrical loading. A description was given of the machine and test methods developed for making such tests on thin strip metal.

In his paper "The Progress of Failure in Metals as Traced by Changes in Magnetic and Electrical Properties," P. E. Cavanagh, president, Cyclograph Services Ltd., Toronto, Ont., Canada, described how relative changes in magnetic and eddy-current losses during normal endurance tests in a rotating beam machine have been determined for six metals at loads above and below endurance limit. By plotting these changes, the author showed how in certain special instances these changes may be used to give a useful method of predicting that a particular metal will fail in normal service.

D. M. Cunningham, E. G. Thomsen and J. E. Dorn, University of California, Berkeley, Calif., discussed plastic flow of a magnesium alloy under biaxial stresses.

Gustaf Soderberg, consulting engineer, Graham, Crowley & Associates, Jenkintown, Pa., reported on the inspection of exposure test panels with anodic electrodeposited coatings.

Structural Steel Institute Officials See Lively Spurt in Building by Next Spring

WHILE structural activity may continue on much as it is over the remainder of the year, it should show a lively spurt by next spring, L. Abbett Post, executive vice president, American Institute of Steel Construction, predicted at a press conference in New York last week.

He looked for better supply of steel, other materials and components, and greater stabilization in labor costs. At present, he said, operations are going along at about prewar levels.

Other officials of the institute supported this opinion, with Jack Singleton, chief engineer, laying special stress on the encouraging outlook in investment type of construction, once conditions become stabilized. This type of work, he said, is accumulating rapidly. In general, he expects ten years of the most active building in history.

The institute whose membership represents approximately 90 per cent of structural fabricating capacity, held a conference of its district engineers in New York for a few days last week. Present were fourteen, from Atlanta, Chicago, Cleveland, Dallas, Tex., Greensboro, N. C., Los Angeles, Milwaukee, Omaha, St. Louis, San Francisco, Seattle, Topeka, Kans., and Worcester, Mass.

Mr. Post said the next annual meeting of the institute would be held in Miami, Fla., in November, a 4-day affair.

He called upon various district engineers to describe briefly conditions in their respective districts. The Cleveland district engineer said public utility work was going ahead actively, but that some industrial work is being cancelled due in part to the uncertain outlook in certain fields and in part to high building costs and the uncertain delivery of building materials. However, most of the industrial work now being shelved was being postponed, rather than cancelled. He said there was still a tremendous backlog of work ahead; also that the cost-plus method of quoting was becoming less general. The speaker declared, too, that there are evidences of better efficiency in labor.

The New England engineer said much institutional work of a "must" character is now going ahead in his district. Also, he declared that various industrial concerns contemplated construction so as to modernize and keep up with the growth in their respective fields.

The Chicago engineer stressed the difficulty encountered with respect to various public works, such as schools, state bridges, etc., where definite appropriations first have to be made and definite prices have to be submitted before the work can go ahead. So often over past months costs have far exceeded appropriations. There is a large amount of public work awaiting action once conditions become stabilized.

In southern California, there is considerable activity, but nevertheless much work still is being held up, especially apartment house construction and the like. In the San Francisco district, high labor costs and lack of materials are retarding operations, although structural shop backlogs are increasing. In Texas, schools and certain other civic jobs are going ahead actively and eventually under better building conditions a heavy amount of construction work will get under way. There are enough offices, hotels and general commercial projects in sight to keep southern structural shops active for ten years at least.

Crucible's New Spring Works Inspected by Group

Marking completion of the first large project in the $30 million expansion program of the Crucible Steel Co. of America, some 30 executives, plant managers, editors and writers last week inspected the company's new Spring Works at Pittsburgh. The works supplies thousands of different sizes and shapes of springs to railroads, to car and locomotive manufacturers and to builders of special heavy equipment. Its products include big elliptical springs, some with over 20 plates of steel, that are tested at weights of tens of thousands of pounds.

Some 300 persons are employed in the works. Automatic machinery and special processes have been adapted to spring manufacture to fullest extent. The works has a capacity of some 3000 tons of springs monthly. Crucible's program calls for improvements and expansion at six other plants.

Output of Steel Barrels, Drums and Pails Increases

Production increases for steel shipping barrels, drums and pails were reported for April by the U. S. Bureau of Census.

Output of heavy type steel barrels and drums totaled 2,455,246 units in April, compared with 2,291,080 in March, and production of the light type rose from 591,879 in March to 742,930 in April. Steel packages, kegs, and pails totaled 6,049,866 in April, compared with 5,304,-124 in March.

Labor Output In Machine Tools Fell During War

Productivity declined 3.8 per cent from 1939 to 1945, despite increase in total production, BLS survey shows

AVERAGE number of man-hours required to build selected machine tools in 1945, the last war year, was 3.8 per cent above the corresponding figure for 1939. This is revealed by a study just completed by the Bureau of Labor Statistics in an effort to determine the trend in labor productivity.

The decreased output per man-hour in the machine tool industry during the war period occurred in the face of a tremendous increase in total output when many machine tool designs were frozen and mass production methods introduced, making possible economies associated with quantity production.

Factors contributing to lower productive efficiency also occurred during this period, including substantial increases in overhead labor, losses of trained personnel, the addition of inexperienced workers and wartime shortages of materials.

The BLS study is based on information supplied by machine tool builders and covers 12 important standard machine tools. It reveals that the number of direct man-hours alone to produce a machine tool (i.e., man-hours of non-supervisory wage earners engaged in productive machine operation and assembly work) declined about 19.4 per cent between 1939 and 1943. After 1943, direct man-hours expended per unit increased approximately 10 per cent and in 1945 were 10 per cent below the 1939 base.

Proportion of indirect labor (supervision, materials handling, maintenance and other factory labor not engaged directly on productive operations) to total labor increased generally throughout the period between 1940 and 1945. Greater use of indirect labor thus partly offset the decline of direct labor requirements up to 1943, and accounted for part of the upturn in unit labor requirements after that year. This reflects the unusual increase in supervision, inspection, production planning and scheduling during the war.

APPRENTICE COMMITTEE: Simmons Machine Tool Corp., Albany, N. Y., has been cited by the New York Department of Labor as giving the best training course in the state. A joint committee composed of two members of the union and two from the management meets regularly to review the company's program and the progress of trainees. Left to right are the committee members: Walter D'Arcy, personnel director; T. J. Westfall, receiving clerk; Edward Strobel, machinist; and Charles A. Simmons Jr., vice president and general manager

Many Types of Tools on WAA June Set-aside List

Many types of tools and equipment of interest to industry are on the War Assets Administration's June list of set-asides to be held for sale to priority claimants, principally veterans.

Included are trucks, automobiles and other motor vehicles, tractors, x-ray equipment, office furniture, machinists vises, drill presses, portable arc welders, electric hand drills, tool boxes, fractional and small horsepower motors, woodworking band saws, drafting tables, small air compressors, portable electric Skilsaws, portable electric sanders, concrete mixers, tool kits complete with tools, paint spray sets, wood and steel work tables, bench grinders, bench lathes, complete electric lighting plants, portable grinders, steel wheelbarrows, fluorescent lamps, engine lathes up to 16-inch swing, circular saws, prefabricated buildings ready for site assembly, draftsmen's equipment, tap and die sets.

Machine Tool Accessory Shop Wage Data Released

New York City tool and die makers in machine tool accessory shops average $1.81 an hour compared to $1.74 an hour for similar tool and die makers in the Newark-Jersey City area, according to Robert R. Behlow, regional director, Bureau of Labor Statistics, announcing release of a wage study of machine tool accessory shops in the Newark-Jersey City area and in New York city.

The study provides a straight-time hourly earnings for selected occupations in a representative group of machine tool accessory shops, including tool and die jobbing shops surveyed in January, 1947.

Overall straight-time average hourly earnings in machine tool accessory plants are approximately the same for the two areas studied, $1.32 an hour for New York city and $1.35 an hour for the Newark-Jersey City area.

There are notable differences, however, for the rates on specific occupations. Machinist production averaged $1.56 an hour in New York city and $1.50 an hour in Newark and Jersey City. On the other hand, engine lathe operators—class A averaged $1.48 an hour in Newark-Jersey City area and $1.42 an hour in New York city.

Six Hundred Tools Offered By WAA at Milwaukee Sale

Approximately 600 precision machine tools stored at WAA warehouse No. 7, Carrollville, Wis., will be sold to priority claimants, including veterans, on a "first come, first serve" basis June 30, at the WAA Customer Service Center, 4574 North Port Washington road, Milwaukee.

Republic Starts 48-in. Strip Mill At Youngstown

New unit will produce skelp for electric weld tube mills in district and strip for further processing into tin plate

PRODUCTION from a new 48-in. strip mill is now underway at the Youngstown plant of Republic Steel Corp. The mill was made by adding three 4-high finishing stands to the present 84-in. plate mill, together with coiling and coil conveying equipment.

The two major items to be rolled on this mill are skelp for Republic's three Youngstown electric weld tube mills and strip for further processing into tin plate at the Niles plant of Republic's Warren District.

Completion of the mill will provide greater integration of the Youngstown plant by bringing about a better balance between ingot production and finishing capacity. The product of the mill will not be sold directly to the trade and will not make available increased tonnages of sheet and strip from the corporation as a whole.

It will accomplish particularly a more efficient co-ordination between the Youngstown and Warren Republic steel plants in the production of tin plate. Republic in Youngstown with five blast furnaces, 15 open hearths and two Bessemer converters has a steel ingot capacity considerably in excess of finishing capacity, while in Warren the opposite is true.

It is anticipated the new Youngstown mill will eventually produce 30,000 tons of skelp for Republic's pipe mills and 20,000 tons of tin plate bands per month.

Steel Labor Turnover Far Below Industry in General

Average number of workers leaving employment in the iron and steel industry is well below the average separation rate for all manufacturing industries, according to the American Iron & Steel Institute.

In 1931, separation rate of iron and steel workers averaged 31.81 per 100 employees compared with 48.38 in all manufacturing industries. In 1939, the rate of separation of iron and steel labor had fallen to 14.94 as against 37.71 in all manufacturing industries. In that year, steel industry's separation rate was lowest of the 34 industrial groups upon which such data were compiled.

The war lifted industrial turnover rates. Many steelworkers entered the armed forces but the industry's low "quit rate" held down average separation from 1943 to 1945. Separations from steel jobs during those years were 30 per cent to 50 per cent lower than the average for all industries.

During 1946, industrial unrest resulted in higher separations in most industries than were experienced prewar, although they were lower than during the war years. Largest factor was voluntary quits, which averaged 4.3 workers per 100 monthly for all manufacturing industries. In steel, monthly quit rate during 1946 at 3.6 workers per 100 was 16 per cent lower than average in all industries.

Many Enforcement Policies On Wages, Hours Rescinded

Pending review of the full implications of the Portal-to-Portal Act of 1947, Secretary of Labor L. B. Schwellenbach and William R. McComb, Wage-Hour and Public Contracts administrator, have rescinded numerous enforcement policies developed during the 11 years under the Walsh-Healey Act and nine years under the Fair Labor Standards Act. Under these policies, enforcement under these laws was stayed "pending clarification by the courts," or "in the expectation of co-operative action by industrial associations in certain industries, or pending further consideration of individual problems presented."

The Portal act, by making administrative practices and enforcement policies binding, makes it necessary to restore the basic policy of strict enforcement free of all qualifications.

The following policy is to become effective June 30: "The investigation, inspection and enforcement activities of all officers and agencies of the Department of Labor as they relate to the Fair Labor Standards Act and the Walsh-Healey Act will be carried out on the basis that all employers in all industries whose activities are subject to the provisions (of these acts) are responsible for strict compliance with the provisions thereof and the regulations issued pursuant thereto."

Coal Reserves Held Adequate for All United States Needs for 1500 Years

COAL reserves of the United States are adequate to supply all this country's requirements for the next 1500 years. This applies to requirements for heat, power, light, transportation, smelting of metals, all liquid and gaseous fuels and most synthetic chemicals.

This was the encouraging message brought to the American Society of Mechanical Engineers at its semiannual meeting at the Hotel Stevens, Chicago, June 15-19, by Dr. Harold J. Rose, vice president and director of research, Bituminous Coal Research Inc., Pittsburgh.

"The world has spent more of its mineral wealth in the last 40 years than in all preceding history," the speaker said. "Production has been particularly great in the United States, so that we already are a 'have-not' nation, or are rapidly becoming one with respect to many important minerals."

The outstanding bright spot in this situation is the large coal supply, amounting to about one-half the world's known reserves.

This is causing a great increase in the support being given to coal research by the coal industry itself, by federal and state governments, by the petroleum, gas and chemical industries and by equipment manufacturers. Expenditures on research and engineering development work closely related to coal are $15 million or more annually in this country.

Eugene W. O'Brien, ASME president, reported the findings of a survey among mechanical and electrical engineers as to whether engineers should be exempted from coverage of the Wagner Act. Seventy-six per cent favored exemption. In answer to a second question as to whether engineers should be covered by a new labor relations law, 54 per cent favored exclusion.

While the majority are against inclusion in labor relations legislation, "a substantial minority, made up largely of younger men, want to retain the right to bargain collectively, providing it can be done with the proper safeguards, and of their own choice and in their own fashion," Mr. O'Brien concluded.

The extrusion method of manufacturing tubes from stainless steel, special steel and nickel alloys was described by Hugo Lorant, vice president and chief engineer of Hydropress Inc., New York. The process as applied to these materials has only lately been developed, said Mr. Lorant,

Commenting on the advantages of the method, the speaker said that conversion of a solid billet into a tube by the extrusion method consumes only a few seconds, during which time no change in temperature takes place.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Committee for Economic Development wins respect and confidence by thorough and objective reports. Press conferences attract interest on par with those of top government agencies. Caliber of men active in group largely responsible

RECENT press conference of the Committee for Economic Development at which it announced its recommendations for a national small business program (STEEL, June 16, p. 70) attracted an attendance on par with the major news announcements of the War, Navy, State and other governmental departments.

Newspapers and wire services, radio and press commentators thus indicated how highly they regard CED announcements as news. CED has won respect on a number of grounds. It does not attempt to say anything until it has something to say. It employs able economists and other experts to help it in its programs. Most important—the CED has no axe to grind. Its only aim is to achieve a bigger and better America—one in which the plane of all citizens will rise continuously, in which productivity is high, and unemployment at minimum. In propaganda-ridden Washington, that is something of a novelty.

In another respect the CED is unique. Although strictly an association of businessmen without statutory authority, it has a quasi governmental power. This springs from its position as the direct offspring of a designated advisor to the secretary of commerce. That is the Business Advisory Council of the secretary of commerce. Alone among private institutions that seek to improve governmental policies that influence business, the CED occupies four rent-free rooms in the Commerce building.

One of the reasons for the respect in which the CED is held is that it is directed or influenced by businessmen who, via the CED or the Business Advisory Council, have had an unexampled opportunity to become familiar with the affairs of government. Out of the group, in fact, have come many of the men who occupy important government posts today. Some of its graduates are:

Undersecretary of State for Economic Affairs William L. Clayton, Army and Navy Munitions Board Chairman R. R. Deupree, United States Senator from Vermont Ralph E. Flanders, Secretary of Commerce W. Averill Harriman, Undersecretary of Commerce William C. Foster, Assistant Secretary of State William Benton, Secretary of the Treasury John W. Snyder, United States Treasurer W. A. Julian, Ambassador to India Henry F. Brady, HOLC Commissioner John H. Fahey, Federal Reserve Board Member Ernest G. Draper.

In addition there is a long list of alumni of this group who have occupied important government posts and who continue to be called on by the President for occasional important assignments. Some of them are: Chester C. Davis, Marion B. Folsom, Eric A. Johnston, John D. Biggers, Thomas B. McCabe, Gardner Cowles, James A. Farley, Lou Holland, Charles R. Hook, Ernest Kanzler, Philip D. Reed, Nelson A. Rockefeller, Charles E. Wilson (General Electric Co.), Beardsley Ruml, S. Abbot Smith, Wayne C. Taylor, Sidney J. Weinberg, William L. Batt, E. R. Stettinius Jr., William S. Knudsen and Donald M. Nelson.

CED Has Deliberate Approach

The press conference on the small business report afforded several examples of the CED's deliberate approach in formulating its recommendations for national policy. Many of the reporters, eager to develop spot news on a subject then in the limelight, pumped Paul Hoffman, CED chairman, for an opinion as to whether the President ought to sign or veto the tax reduction act. Had Mr. Hoffman been inclined to base his answers on purely selfish business considerations as of the moment, he doubtless would have gone on record as favoring the signing of the act.

Instead, Mr. Hoffman said that in his opinion the President should sign the act if the outlook appeared to him to be deflationary, or to veto it if the prospects seemed inflationary. Mr. Hoffman went on to say that there is no agreement among businessmen as to the nature of the outlook; some think business will continue good over the rest of this year, while others look for a depression. In the absence of a definite CED position as to the nature of the business outlook, he said, he could not, as its spokesman, attempt to say what action the President should take.

The CED approach also was reflected by the answer to a question as to what specific changes in the antitrust laws are necessary to stimulate private business. This answer was given by Dr. A. D. H. Kaplan, Brookings Institution economist, who largely supervised the writing of the report on small business policy. He made no bones about stating that it probably would take a "couple of years" before the CED decides on desirable antitrust law changes.

"There is a vast amount of disagreement among businessmen, and especially small businessmen, as to laws that are good or bad for business," said Dr. Kaplan. "Laws that some businessmen would like would be introduced only over the dead bodies of others. It no doubt is true that what is good for one type of business is not necessarily good for another. So there is a big area which will have to be explored, and a lot of people will have to be consulted. We know about some of the things that are wrong under today's laws, but there is a lot more on which we have to get information and agreement. All we can say now is that we hope to come up later with a program that will give maximum freedom and encouragement to business."

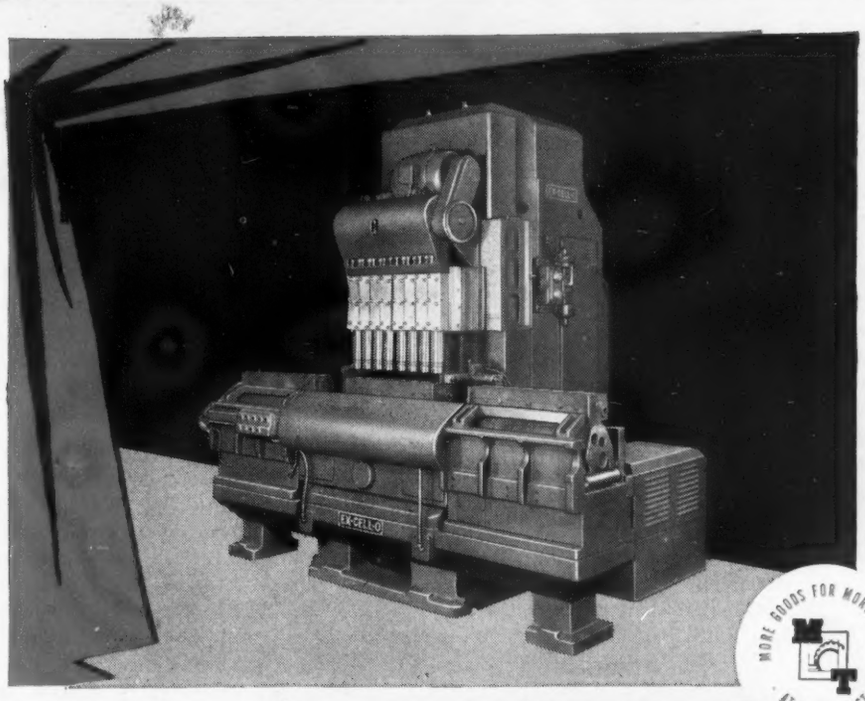
Another example was afforded by the answer to questions about the CED proposal for the organization, under the Federal Reserve System, of banks specializing in supplying capital needs of business, particularly small business. Here too, it was admitted, a lot more work and study will be required. Dr. Kaplan said frankly that the proposal does not yet enjoy the full support of the country's bankers. Some of them, he said, are for it, and others against it.

The next CED recommendation, Mr. Hoffman revealed, is expected to come out in the latter part of 1947. It will set forth a program for a permanent national tax policy aimed at stimulating small business. One of its main points will be a recommendation for balancing profits and losses over long periods—as six years, for example—in order to prevent companies from being bled unduly on the earnings during profitable years and thus being precipitated into bankruptcy in ensuing lean years.

Another CED study which will be publicized as soon as possible, Mr. Hoffman said, will deal with present intrastate barriers to business activity. This will call for the elimination of existing laws that limit competition and opportunity—as laws calling for the purchase of retail sales licenses, fixed-price laws and similar restrictions on business.

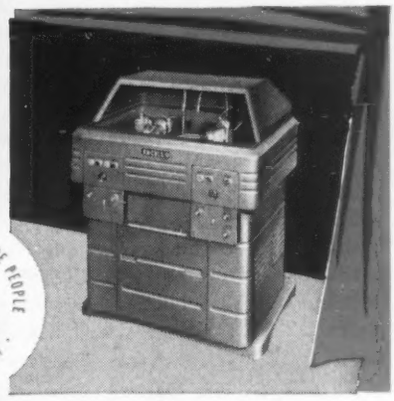
Jap Trade Controls Eased

Although the decision of General MacArthur's SCAP (Supreme Command Allied Powers) to admit 400 private trade



EX-CELL-O CYLINDER BORING MACHINES

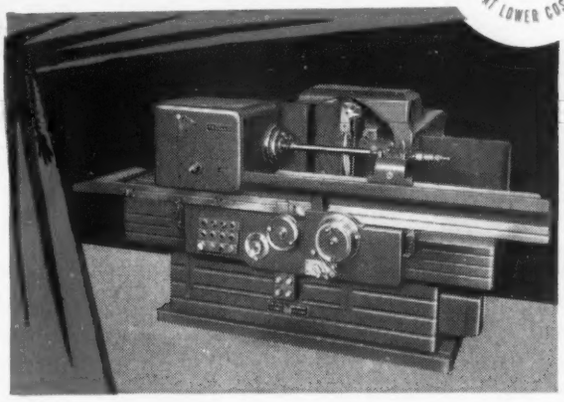
Boring as a method of precision machining automotive cylinders is a pioneer development by Ex-Cell-O. Here is shown the latest Ex-Cell-O machine of this type, Style 66 Vertical. Can be used also for boring holes in other parts where accuracy of roundness and straightness is required. *See it at the Show!*



MORE GOODS FOR MORE PEOPLE AT LOWER COST

NEW IMPROVED THREAD GRINDER

This new Ex-Cell-O Style 35-A Precision Thread Grinder is hydraulically operated and electrically controlled. Accommodates single or multi-rib wheels, with diamond dressers or form crusher. Leads from 1 to 128 threads per inch obtained with standard change gears. *See it at the Show!*



Automatic TOOL GRINDER

Designed for fast conditioning of straight faces of carbide-tipped, stellite, and high speed steel cutting tools. Ex-Cell-O Style 40 Automatic Grinder is extremely economical for the conditioning of varying quantities of identical tools. *See it at the Show!*

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47—26

EX-CELL-O CORPORATION

DETROIT 6
MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CONTINENTAL CUTTING TOOLS • MISCELLANEOUS PRODUCTION PARTS
FUEL INJECTION EQUIPMENT • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • DAIRY EQUIPMENT

representatives to Japan has been hailed generally as the forerunner to the reopening of private trade with Japan, actually the program will be under full government control on both sides and represents only a very slight loosening of the tight controls under which the Japanese must operate.

According to a copy of General MacArthur's statement, the step only partially lifts the "economic blockade" of Japan and "falls far short of full economic solution" of Japan's problems. "This can be accomplished only through the medium of a peace treaty, and the sooner this is accomplished the better, not only for Japan but for the world," the MacArthur statement says.

American merchants seeking to do business with Japan should address their applications to the Inter-Allied Board of Trade, Far Eastern Commission, State Department, Washington 25. By a peculiar coincidence, this outfit has been quartered in the old Japanese Embassy on Massachusetts avenue. Any merchants or manufacturers who believe they now can do business with Japan should make application.

Business transactions will be arranged through the SCAP and the Nippon Board of Trade (Boeki Cho), although the foreign businessmen will be permitted to talk and discuss prices, quantities, quality, etc., with Japanese manufacturers. Inasmuch as no exchange rates can be applied to Japanese currency under present conditions, SCAP commodity specialists will establish prices based upon world market standards weighted in accordance with the current Japanese conditions.

Interested American businessmen also will do well to address any pertinent questions about Japanese products and Japanese conditions to the U. S. Commercial Co., 811 Vermont avenue, Washington 25. That interest, which will continue to handle government-to-government transactions between the United States and Japan, is thoroughly acquainted with the present-day Japanese economy.

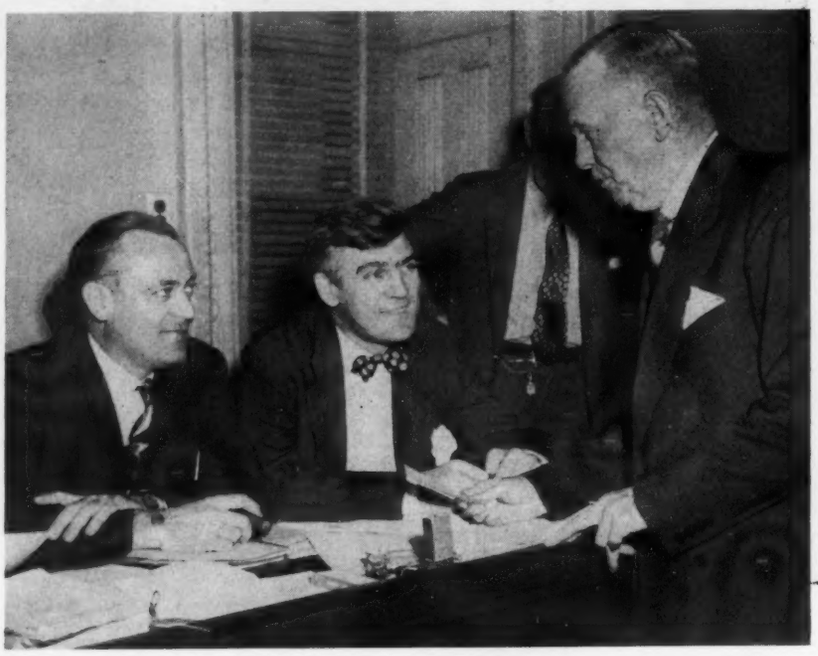
Export-Import Bank Extended

The reincorporation of the Export-Import Bank of Washington, accomplished under an act signed by President Truman into Public Law 89 on June 9, is of special significance to many lines of business.

"One of the most important fields of the bank's activities is the extension of assistance to United States exporters of heavy machinery and other capital equipment," said the House Committee on Banking & Currency in reporting the bill.

"Such products are often manufactured to specifications and require from a year to 18 months or more for completion and delivery or installation abroad. With the existing limitation precluding disbursements after June 30, 1948, the bank is presently limited and will soon be prevented from operating in one of the fields most important to the foreign trade of the United States."

As provided under Public Law 89, 80th Congress, the Export-Import Bank now has a charter to continue operations until June 30, 1953, with power to enter into new obligations up to that date for subsequent execution.



PLEADS FOR BUDGET: Secretary of State George C. Marshall, right, appears before Senate Appropriations Committee to ask the help of Congress "at a critical time in world affairs" by restoring a $55 million cut from the department's budget for fiscal 1948. Listening are, left to right: Sen. H. Styles Bridges, chairman of the committee, and Sen. Joseph H. Ball (Rep., Minn.). NEA photo

Business Censuses Streamlined

When Congress, 20 years ago, set up the present law governing the taking of business censuses, the main interest was in production. Since then the interest in statistics not only has increased but has shifted. Today more businessmen are interested in distribution statistics, and continually call on the Bureau of the Census for information of this kind to use in their planning.

Under the existing law, the bureau takes a census of manufactures every two years, and a business census every ten years; the next censuses are due to be taken, respectively, in 1948 and 1950. But the bureau has a technique under which it conducts abbreviated annual censuses called "surveys." These surveys, which are made with a large amount of co-operation from the interested industries, have met the demand for both production and distribution quite satisfactorily.

Now the law governing censuses is to be streamlined so that the bureau can do the most with the census dollars allocated to it by Congress. H. R. 1821, already approved by the Senate, has been reported favorably by the House Post Office and Civil Service Committee and is expected to be approved by the House. Under it, the bureau will conduct a complete census of production and distribution at intervals of five years, with "surveys" in the years between.

Synthetic Fuel Program Favored

Following hearings, during which Bureau of Mines officials gave a favorable account of their stewardship of the synthetic liquid fuels program authorized by Congress in 1944, the House Committee on Public Lands has reported favorably H. R. 2161. Introduced by Rep. Francis Case (Rep., S. Dak.), it would extend the life of the program until April of 1952. It also would increase the appropriation for the program from $30 million to $60 million. Chances are good for House and Senate approval. The program aims at development of processes for production of commercial liquid fuels from coal, oil shales and agricultural and forestry products.

Rehabilitation, Sale of Federal Barge Lines to Private Operators Urged

River transport system operating at deficit under government ownership. Modernization to increase efficiency and to cut operating costs by 50 to 60 per cent would require investment of some $17 million

WHILE government officials usually are willing to support the principle that the government should stay out of competition with private business, in practice it does not work out that way. When it comes to specific enterprises it is more often than not that reasons are found why the government should engage in business activities in the "public interest." One of the toughest assignments that Congress can tackle is to try to get the government out of a business in which it is established.

The report of the House Small Business Committee as to what shall be done with the Federal Barge Lines is in keeping with this tradition. After exhaustive hearings in Washington and throughout the areas in which the federal lines operate, the committee has come up with a recommendation for the "immediate rehabilitation and sale of the Federal Barge Lines to private operators." However, the emphasis is given to rehabilitation at a cost of some $17 million, including $1 million "for a new type demonstration unit of a proposed integrated tow. . . . to cut operating costs of the lines by 50 to 60 per cent."

Urges Prompt Sale

The report urged establishment of a commission to expedite prompt sale of the lines and suggested that the commission consist of one representative, one senator, the president of the Inland Waterways Corp. and a member of the Interstate Commerce Commission. But no bill to implement such a provision has been introduced.

The Federal Barge Lines operate up and down the Mississippi as far as Minneapolis and St. Paul, up and down the Illinois between Chicago and St. Louis, up and down the Missouri between Kansas City and St. Louis, and up and down the Warrior River between Birmingham, Ala., and New Orleans. Equipment Dec. 31, 1945, consisted of 22 towboats, 1 line tug, 1 harbor tug, 189 cargo barges and 36 miscellaneous barges —also 2 locomotives and 2 cars for use at terminals. Like a good many government undertakings, they operate at a loss. The deficit was $845,234.26 for 1945 as compared with $385,545.49 in 1944.

However, the lines performed useful service as shown by freight haulage. They transported 1,889,259 tons in 1945 as compared with 2,084,156 tons in 1944.

In the hearings it was brought out that the deficit could be reduced—perhaps turned into a neat profit—by rehabilitation which will increase efficiency. For instance, the most modern handling equipment now in use at the 20 terminals comprises hand trucks. By the use of pallets, battery-operated trucks, cranes, etc., it was said, the cost of operating terminals can be reduced 60 to 65 per cent. Capital outlays for such equipment are included in the $17 million recommended by the committee as necessary to rehabilitate the property.

The freight hauled by the lines includes bulk and merchandise freight of all descriptions. They take substantial tonnages of steel products and pig iron out of Chicago for delivery to points throughout the Mississippi system. They haul large tonnages of scrap from collection centers to consuming points. Barge freight rates are 5 to 40 per cent less than competitive rail rates, but average 20 per cent less.

The Federal Barge Lines are prohibited by law from operating beyond Cairo up the Ohio river. However at Cairo they pick up many shipments of coal, steel and other goods that originate along the Ohio. A move now is under way to extend their operation into the Tennessee River.

While the government should get out of the barge line business, the report says, it should not step out "until a similar type of service is provided by private enterprise." If the Federal Barge Lines discontinued service at this time, small business would be driven from the river since it ships almost entirely in less-than-barge-load quantities," says the report. "The benefits of river transportation would then be restricted to a comparatively few large shippers of bulk freight in barge load quantities. In effect, river transportation would then be available only to shippers of coal, steel, grain, sulphur, oil and a few other bulk commodities."

In the meantime, the program of the Inland Waterways Corp., which is the official government name for the Federal Barge Lines, continues to be of a long-range character. One of the problems which it is tackling is the development of boats and barges specially designed for use in the swift-water, shallow channels of the Missouri River; this is being supplemented by Army Engineers studies aimed at better channel control in the Missouri. In seeking to develop better river craft, says Capt. A. C. Ingersoll Jr., president of the Inland Waterways Corp., best results will be sought through model basin testing and experimental construction.

Captain Ingersoll appears to be satisfied that the screw-propelled tunnel-stern towboat on the Mississippi River definitely has supplanted the old stern-wheel design. Also that the Kort nozzle, designed in Germany and perfected by the Dravo Corp. in the United States, has resulted in greater towing efficiency than ever before obtainable.

"During the war," according to Captain Ingersoll, "the development of high-speed diesel engines, reduction gears and dependable clutching arrangements has enabled the construction of high-power, low-cost towing units in small packages. Developments along this line are currently progressing rapidly. The Inland Waterways Corp. in the construction of new equipment or the alteration of old boats will attempt to serve as the experimental laboratory of the industry by keeping in the foreground of such technical developments."

AFA Directors To Hold Annual Meeting July 29-30

The annual meeting of the directors of American Foundrymen's Association will be held at the Palmer House, Chicago, July 29-30. President Sheldon V. Wood, president-general manager of Minneapolis Electric Steel Castings Co., will preside at meetings of the present executive committee and board on the 29th. On the 30th, Max Kuniansky, vice president-general manager of Lynchburg (Va.) Foundry Co., will take office as 46th president of the AFA. William B. Wallis, president, Pittsburgh (Pa.) Lectromelt Furnace Corp., will be installed as the new vice president of the association.

Railway Suppliers Meet in Atlantic City This Week

Railway Supply Manufacturers' Association is holding its first exhibition convention in ten years this week at Atlantic City, N. J. More than 25 railway supply firms are exhibiting over $10 million worth of equipment, including the latest in locomotives and railway cars.

Coincident with this exhibit, the Mechanical Division and the Purchases & Stores Division of the Association of American Railroads will hold their annual conventions.

Mercury Imports Force Domestic Mines to Close

Domestic production approaching vanishing point. Only four western mines being worked

SAN FRANCISCO

QUICKSILVER mining in California and other western states is being suspended due to competition from foreign mines. Producers in Spain and Italy are able to sell their output in this country at lower prices than it costs U. S. mines to produce. Domestic production, consequently, is approaching the vanishing point.

At present only four of the most efficient far western mines are being worked, two on a part time basis. This compares with 146 mines in operation in 1943 at the peak of wartime activity.

Current trend in quicksilver competition began several months ago when Mercurio Europeo, the Spanish-Italian cartel, set a U. S. selling price at $65 a flask (each flask contains 76 pounds of quicksilver). Including a tariff of $19 a flask, the foreign metal was priced at $84 a flask delivered, New York.

In order to return a reasonable profit, domestic mercury producers claim they need a price of $120 to $130 a flask. For most of them, costs are above $100 a flask.

On the other hand Spanish and Italian mercury mining costs are estimated at no more than $25 a flask, largely because of cheap labor. In California, miners' wages have risen to $9 or $10 a day from the prewar level of $4 to $5 a day.

Mining officials believe the remaining western operating mines will be closed should the Spanish-Italian cartel cut prices another $10 a flask. They are fearful such a reduction will be made, recalling a similar trend in 1931 when the cartel cut prices to $50 a flask.

By 1939, mercury prices were back again to a level ranging between $85 and $90 a flask. However, a huge wartime demand for the metal boosted the price to $190 a flask, the OPA ceiling.

The war also brought new uses for this metal. Chief of these was its use in the mercury battery, a miniature cell now being widely adapted to peacetime use in small radios, hearing aids and other electronic devices.

Mercury has more than 3000 other uses in industrial products, pharmaceuticals, paints, insecticides, etc. Despite the wide variety of consumption outlets, however, supply of mercury far outstrips demand, chiefly because of the large amounts of foreign metal being dumped into this country.

In 1939 total supply was slightly more than 22,000 flasks, of which about 2500 were imported. Consumption in 1939 was about 21,000 flasks.

By 1943, when wartime needs were greatest, U. S. mines were producing about 52,000 flasks and another 48,000 were imported. Consumption in 1943, however, totaled 54,500 flasks, so the remaining 45,500 flasks went into government stockpiles.

Since 1943, consumption has been trending downward. In 1946 U. S. industry used 30,800 flasks of quicksilver, and the total is expected to be lower this year. Meantime, prior to the recent domestic shutdowns, supply of mercury continued to increase. In 1945 the combined total of U. S. production and foreign imports totaled 50,000 flasks more than consumption.

California mines, which produced about 70 per cent of all U. S. domestically mined quicksilver, last year had output of 17,804 flasks valued at $1,648,758 at the mine, compared with 1945 production of 21,063 flasks, valued at $2,697,835.

WIRE FISH TRAP: Netting is woven in the wire mill of Columbia Steel Co.'s plant at Pittsburg, Calif., to be made into fish traps to be set for salmon off the coast of Alaska. The traps are labyrinths of wire netting into which the fish wander and are unable to find their way out. The weaving process is similar to that used in weaving fencing

Report on Mercury Explorations

Results of Bureau of Mines exploratory work on 10 mercury projects in Alaska are set forth in Report of Investigations 4065, free copies of which may be had by addressing the bureau, Washington 25. The report sums up information obtained in 1942 and 1943 as a result of explorations which added 600,000 tons of ore, equivalent to 37,000 flasks, to the national estimate of mercury reserves. The deposits studied are all in southwestern Alaska.

British Metalworking Industries Recovering from Crisis in Fuel

Steel production rebounds to near January rate, but industry spokesmen doubt that 1947 output will equal that of 1946. Machinery exports rise to new high and are double 1938 shipments abroad. Engineering firms have full order books

BIRMINGHAM, ENG.

GOOD recovery in iron and steel production was made in April. Steel ingots and castings which slumped from a rate of 12,470,000 tons a year in January to 10,190,000 tons in March owing to the fuel crisis, rose to 12,294,000 tons in April, or a weekly average of 236,400 tons. This was still below the weekly average of 252,000 tons in April, 1946.

Pig iron production also increased to a weekly average of 139,000 tons, but the highest weekly average this year was achieved in January when it touched 150,000 tons. The Iron & Steel Federation states that the April level was achieved only by depleting stocks of steelmaking materials and especially pig iron.

It is doubtful whether output over the 12 months will approximate that of last year despite the steady efforts put forth within the industry itself. It has been obvious for a long time that the full requirements of the nation could not be met from home sources and hopes had been held out of obtaining supplies from overseas, particularly from the United States. Limited tonnages of semifinished steel are coming in from the U. S. and Canada, but they are not sufficient to ease the rerollers' difficulties. There has been a scarcity of billets and sheet bars for many months and some mills are now almost wholly dependent on day-to-day deliveries which are insufficient to maintain full production of bars, light sections, strip and sheets.

In the heavy steel trade requisitions for electricity generating plant and railroad material are very substantial and the National Coal Board has also placed a considerable tonnage for mining equipment. Plate mills cannot keep pace with the urgent call for light and medium plates and much work is held up in consequence while extended deliveries are now indicated for joists and sections. Shipbuilders, engineers and tube makers are working on reduced allocations which amount to no more than 50 per cent of normal requirements.

Engineering, however, makes a good showing in overseas business. A survey made recently by the Engineering Industries Association shows that of 3000 member firms 81 per cent are engaged in export business and most of them desire to increase activity with their customers abroad. One of the difficulties is that many engineering firms have order books which are already full and are unable to accept more work. A considerable number of firms are exporting more than 75 per cent of their products.

Motor manufacturers have made a good recovery and machinery exports in April set up a new record. The value of machinery business up to the end of the month was about 54 million sterling, showing an increase of some 34 million as compared with the same period in 1938. Among overseas customers for British machinery Eire is a leading purchaser. South Africa and India take considerable quantities of boilers and boiler house plant. Russia is also buying large quantities of machinery.

British manufacturers of iron and steel are threatened with another rise in rail freight charges as it is expected railway workers will press new wage claims. In the background also is the threat of nationalization of the steel industry which it is said is to be accomplished within the lifetime of the present government. In spite of this, however, the industry is pushing ahead as far as possible with long term reconstruction plans.

British foundrymen have a large tonnage of light castings on order coming chiefly from the boom in the building trade. But they have little chance of overtaking arrears and indeed in some instances production is slipping back because of the meager allocations of foundry grades of pig iron. The position has worsened owing to the urgent need to provide basic iron for the steelworks.

J. F. Lincoln Reports Steel Expansion in Australia

Expansion of the iron and steel industry in Australia is one of the major projects in the intensive industrialization now going forward on that continent, according to J. F. Lincoln, president, Lincoln Electric Co., Cleveland, who has just returned from a trip to that country.

Mr. Lincoln said steel is being produced there cheaper than anywhere else in the world and that operations would be expanded tremendously during the coming year.

Steel is being produced efficiently and economically by Australian Iron & Steel Ltd., owned by Broken Hill Proprietary Co., at Newcastle. Steelmaking facilities are located in close proximity to several company-owned collieries which are extracting high-grade coking coal from 30-ft thick seams. Limestone is obtained from deposits within 100 miles of the steelworks. Low phosphorus, high-grade iron ore is shipped about 1100 miles to the plant, principally from the famous Iron Monarch and Iron Knob deposits near Whyalla. It is estimated, Mr. Lincoln said, that known ore reserves are sufficient to last at least 100 years.

U. S. Grinding Wheel Group Honored for War Service

William M. Rowland, president, Abrasive Industries Association of England and Universal Grinding Wheel Co. Ltd., Stafford, England, presented an antique silver bowl to the Grinding Wheel Manufacturers Association at a luncheon in Hotel Barclay, New York City, recently.

The bowl, 200 years old, was a gift of the British association as a token of appreciation for contributions made by American manufacturers during World War II through shipments which formerly were supplied by Europe. Dr. Frank R. Henry, Simonds Warden White Co., Dayton, O., accepted the gift on behalf of the association, as its president.

F. J. Tone Jr., the Carborundum Co., Niagara Falls, N. Y., extended to Mr. Rowland the formal greetings of the association, as chairman of its board of directors.

Mr. Rowland sailed from New York for England June 11, after spending time in both the United States and Canada visiting various abrasives plants.

Crane Co. May Build Dutch Wire, Pipe Fitting Factory

J. L. Holloway, president of Crane Co., Chicago, has revealed that negotiations are going on with Bubbink Co. of Doespurg, Holland, to build and jointly operate Holland's first wire and pipe fitting factory.

Mr. Holloway, however, denied reports that an agreement has been reached, although he indicated a decision is expected in the next few weeks. Delaying factors are the complicated financial arrangements to be worked out. Equipment for the proposed plant would be ordered in the U. S. and paid in U. S. funds by Crane, while remaining capital would have to be raised in Holland by sale of a stock issue.

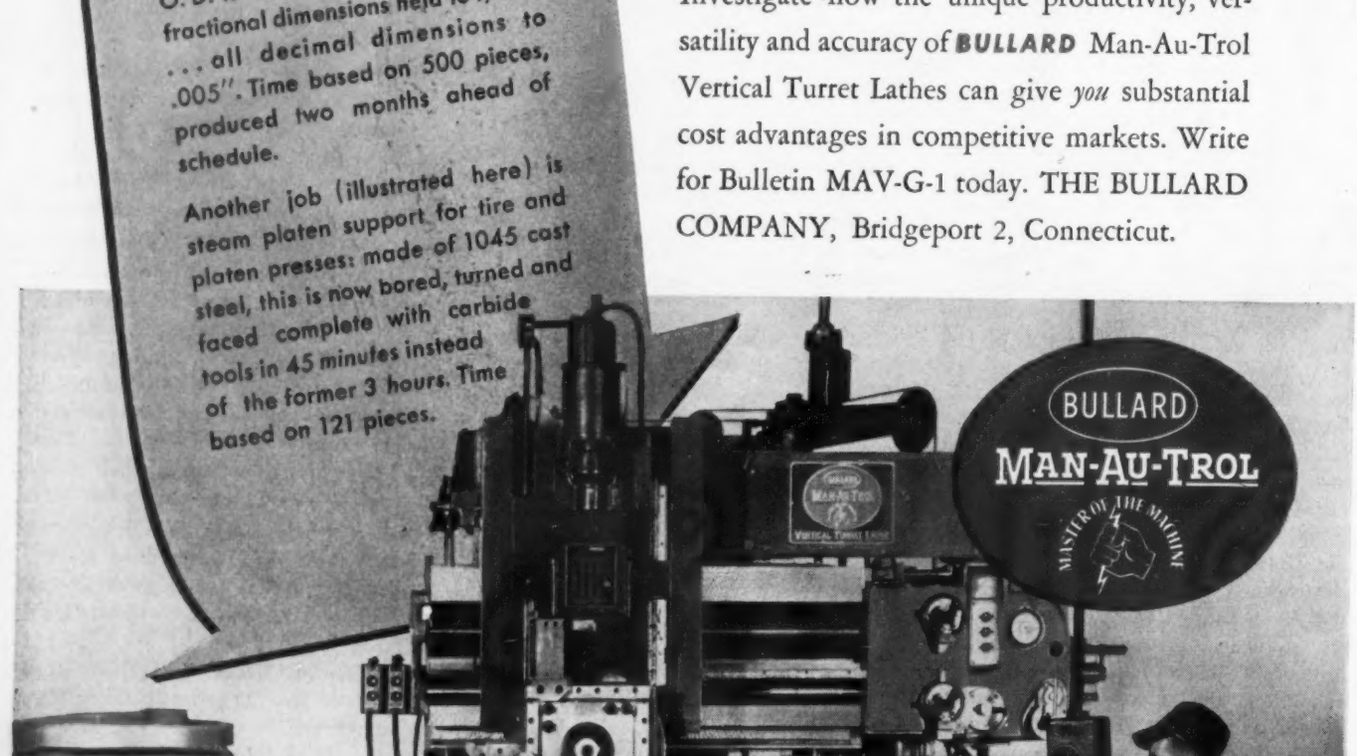
America's largest manufacturer of tire and tube curing presses reports:

Crank Gear Blanks Machined 12 Times Faster on a BULLARD Man-Au-Trol V. T. L.

BULLARD 36" Man-Au-Trol Vertical Turret Lathe is setting new production records for The McNeill Machine & Engineering Co., Akron 11, Ohio. For example: a crank gear blank of welded steel — O. D. 27.166" — which formerly took 4 3/4 hours, is now bored, finished and faced complete in 22 minutes in one setup except for the crank pin bore. Another with 28.500" O. D. is done in 27 minutes. All fractional dimensions held to 1/64" . . . all decimal dimensions to .005". Time based on 500 pieces, produced two months ahead of schedule.

Another job (illustrated here) is steam platen support for tire and platen presses: made of 1045 cast steel, this is now bored, turned and faced complete with carbide tools in 45 minutes instead of the former 3 hours. Time based on 121 pieces.

Investigate how the unique productivity, versatility and accuracy of **BULLARD** Man-Au-Trol Vertical Turret Lathes can give *you* substantial cost advantages in competitive markets. Write for Bulletin MAV-G-1 today. THE BULLARD COMPANY, Bridgeport 2, Connecticut.



BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Smaller engines with more rugged construction will result from trend toward higher compression and increased efficiency. Considerable beefing up of engine and more attention to cooling characteristics will be required

DETROIT

PATTERN of automotive engine development in the years just ahead—at least as far as General Motors Divisions are concerned—can be deduced from the research work reported at the SAE meeting a few weeks ago by C. F. Kettering (STEEL, June 9, p. 61). A basic engine design is going to be worked out which will permit a gradual stepping up of compression ratios from the present 6.5 to 1 to an eventual 12.5 to 1, with a 35 per cent or better improvement in fuel economy.

To do this, a number of things will be necessary, of primary importance to industry suppliers who have anything to do with engine components. In the first place, engines will be smaller in overall size, but considerably more rugged in construction. Weight per horsepower will be on a par with present engines, but with the high-compression design an equivalent or higher horsepower can be obtained with an engine having 25 per cent less cubic inch displacement than present engines. For example a conventional engine with 3½-in. bore and 4⅛ in. stroke and developing 85 hp at 3400 rpm is matched by the high-compression engine having a square design, with 3⅜ in. bore and 3⅜-in. stroke, developing 95 hp at 3600 rpm. Displacement of the conventional engine is 238 cu in.; of the latter design only 181 cu in.

Several Refinements Necessary

Considerable beefing-up of the present engine is an obvious necessity, as well as improved cooling characteristics, to withstand the higher compression and firing pressures. This means added strength in block and head castings, shorter and heavier crankshafts, heavier sections in connecting rods, more main bearings, stronger piston pins and connecting rod bearings, additional oil pumping capacity, larger radiators and water pumps, and better valves.

On the basis of present experience, the overhead valve type of engine seems better adapted to the high compression design, so it is likely this valve arrangement will be used in the new engines. High stresses involved would seem to indicate a 6-cylinder or V-8 type of engine, rather than the straight 8 with its long crankshaft subject to whipping and vibration. Fortunately, the short engine with smaller overall dimensions is just what car designers want, since it permits them to shorten engine compartments and put more usable car space between the front and rear wheels, to say nothing of improving the drivers' vision.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	389,829*	247,620
June		216,637
July		331,000
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* Preliminary.

Estimates for week ended:

May 31	79,315	33,895
June 7	98,499	45,043
June 14	98,471	50,206
June 21	100,000	54,475

It is not likely the trend toward higher compression ratios in engines will be confined to General Motors models. It will be recalled when Chrysler and Plymouth brought out their high-compression engines a good many years ago and more or less revolutionized the concept of automotive engine design, the rest of the industry was not long in following their lead. Now, the next step is at hand, and industry-wide acceptance is almost a foregone conclusion. If the oil companies have the fuel ready—and there are few insurmountable problems on this score—then the automotive industry will have the engines, if not in one or two years, then certainly in three or four.

The new high-compression engines will be more costly to build, perhaps by 5 or 10 per cent. Tolerances will be closer, materials will have to be of improved quality, inspection more meticulous. Low-alloy high-tensile steels would appear to have good possibility for use in crankshafts, connecting rods and other steel components. More research is indicated on valve steels, since already there are troubles with corrosion of valves developing from the use of leaded gasolines. Higher octane fuels, still leaded, may accentuate this corrosion problem and thus sound the call for better alloy steels for valves. Larger radiators and water pumps probably will be required, along with more positive oil pumping systems which will extend lubrication to pistons. Improved bearing alloys, capable of standing up under loads two or three times the present impost will be needed, if they are not already available.

Keep in mind, in reading all the above, that the motor car and its engine develop through evolution and not revolution. There will be no motor cars on the market next year, or even the year after that, which will be operated at a one-third saving of fuel. Eventually, however, they are as certain as death and taxes. Representatives of the press who rode in the GM experimental cars at French Lick, Ind., recently, say they could not tell the difference between the high-compression engine and the conventional engine, except that at high speeds the former seemed to have a lot more get up and go. The old idea of roughness and vibration being handmaidens of high compression ratio is out of the window. Proper designing, judicious selection of materials and the experience of many years in the manufacture and operation of low-horsepower diesel engines have ruled out this old phobia.

Profits Are Spark Plug

Talking about engines brings to mind the most apt simile expounded by C. E. Wilson, GM president, in his address before the American Society of Mechanical Engineers in Chicago last week, in which he sought to show where Karl Marx went wrong in spelling out the communistic or statism philosophy of government. The GM president cogently pointed out that "free enterprise and its essential elements can be compared to an automobile engine and its parts. Savings and credit are the flywheel, banks and financial institutions are the crankshaft balancers and the lubrication system. Confidence is the self-starter. The hope of profit is the spark plugs and ignition system, and the fuel used is the

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B-50 SUPERBOMBER: With its 34½-ft vertical tail folded to allow overhead clearance, the first B-50 bomber rolls from the Seattle plant of Boeing Aircraft Co. The AAF's new standard long-range bomber, the B-50 is powered by four 3500-hp Pratt & Whitney Wasp Major engines which make for "speeds considerably in excess of any present bomber equipped with piston-type engines"

productive effort of all of us who work. The octane number of the fuel is raised through education, initiative and attitude toward work. At present some people feel that the fuel has a pretty low octane number which cuts down the power of the engine and makes it knock a bit.

"As efficient and useful as this free-enterprise engine is, I still believe that it can and will be improved just as I believed 25 years ago that the rough and at that time inefficient 4-cylinder motor car engines could be improved. But I am certainly against discarding this proved efficient engine that gave the American people the highest standard of living in the world and replacing it with some imported type from east of the Rhine or even from England—like for example the jet engine—which has only one spark plug, the state, and depends for its power on a blast of hot air."

The address of former President Herbert Hoover at Princeton University in which he entered a plea for recognition of all the benefits which the "terrible reactionaries" have brought this country, together with the calm logic of Mr. Wilson, in which he delineated how initiative and enterprise have provided a standard of living in the U. S., nine times the level of the best in any foreign nation, are comforting islands in the hurricane of weird ideologies now sweeping the world.

Wilson had some sound comments on the subject of profits which are being attacked so viciously by certain elements of this country's population. He said, "An integral part of the capitalistic economy is the profit system, or more strictly the profit and loss system. Hope of profits and fear of loss are principally what makes capitalism work.

"We can all have more only if we produce more. Increases in productivity are not automatic, nor are they, generally speaking, the result of increased effort by workers. They result from improved tools, new processes and new inventions, and these come about because some one is willing to save part of his current income and risk it in financing new developments—all in the hope of making a profit."

Tucker Has Problems

Preston Tucker and his much-publicized Tucker Torpedo, or the Tucker 48 as it is now being called, are having their troubles. On the eve of issuing a $20 million security issue to finance the new venture, an inquiry initiated by the SEC regarding some of the statements accompanying the company's stock prospectus seemed to douse a little cold water on the project. Charges that the big automotive interests in Detroit were bringing pressure to bear against the new corporation were widely circulated in Chicago, where Tucker is holding down the Dodge Chicago plant in the hope he will eventually be able to get production going this fall. Around Detroit, such allegations were little more than a joke, since the automobile industry has problems of considerably greater magnitude to worry about than the advent of a newcomer like Tucker with a mere $20 million tucked under his belt, and that still in the future. Tucker says he will have several hundred cars built and ready for sale later this year, at a price of around $1800. If he does, he can take the "miracle man" banner from Kaiser-Frazer where it now reposes.

K-F Buys Foundry

Kaiser-Frazer, incidentally, has purchased for $262,000 all assets of the Round Oak Co., Dowagiac, Mich., gray iron castings plant, and it will henceforth be known as the K-F Dowagiac Foundry Division. The company has been producing 50-60 tons of finished castings daily, principally engine manifolds for K-F, and has capacity for about twice this tonnage.

Adds To Frame Plant

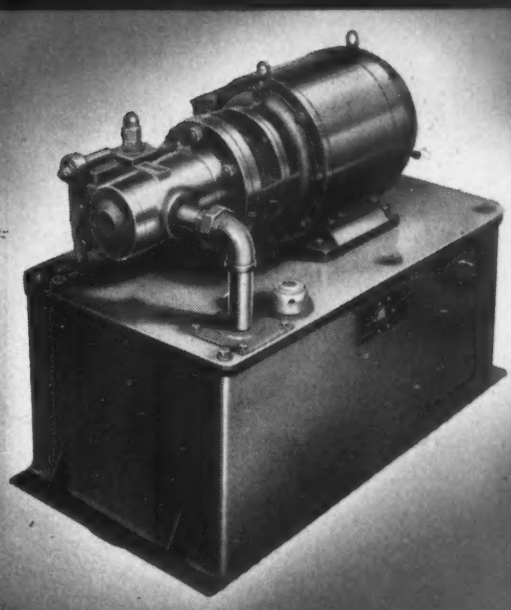
Meanwhile Parish Pressed Steel Co. in Reading, Pa., is putting finishing touches on a $600,000 addition to its frame plant to meet increasing frame requirements of Kaiser-Frazer. Capacity of the Parish plant has been 35,000-40,000 cars and truck frames monthly, and a substantial increase will be possible with the expanded facilities covering 130,000 square feet of manufacturing space.

More Talent for Ford

More top-flight talent has been added to the executive ranks of Ford Motor Co. John Oswald, for 18 years a leading engineer in the body design department of General Motors, and for 13 years chief body engineer for Oldsmobile, has joined Ford as executive engineer of styling and body engineering, co-operating with George W. Walker, styling consultant, and T. L. Hibbard, director of styling.

L. H. Pomeroy, former director of national field activities for the public relations department of General Motors, has joined the executive staff of Ford's Dearborn Motors Corp., tractor producer, as western sales manager. R. E. Roberts, formerly head of General Motors' operating community activities, and active with Ford in similar work since May 1, has been named director of a newly created management relations department at Ford, and will be responsible for development and supervision of policies, plans and programs covering all phases of management relations. New sales manager for Ford's Lincoln-Mercury Division is J. E. Bayne, 45-year-old general sales manager of Plymouth Division of Chrysler Corp. since 1940.

Simplify and Save on Hydraulic Systems with VICKERS POWER UNITS



The "hydraulics" on this Ingersoll 24-Station Process Machine transfers the transmission castings from station to station and provides power for clamping, locating and chip disposal. The hydraulic system design was simplified and cost reduced by using the twelve standard Vickers Self-Contained Hydraulic Power Units shown.

These units provide a compact hydraulic power package which can be applied to almost any system. They are available with various pump combinations to meet a wide range of requirements up to pressure demands of 2,000 psi. There are 92 standard sizes and types of single stage, two stage and dual pressure pumps equipped with motors from ¾ to 20 hp.

The oil reservoir serves as a base to save floor space. On it is mounted a standard Vickers Motorpump or a Vickers pump with separate motor drive. A Vickers "balanced piston type" pressure relief valve provides accurate control of hydraulic pressure. A simple wrench adjustment sets maximum operating pressure at any desired figure within recommended pressure range. Filters and reservoir are readily accessible for cleaning. See Bulletin 46-43 for the many other features.

Vickers Hydraulic Power Units are frequently the most desirable source of hydraulic power. Vickers application engineers will be glad to discuss your hydraulic power and control problems.

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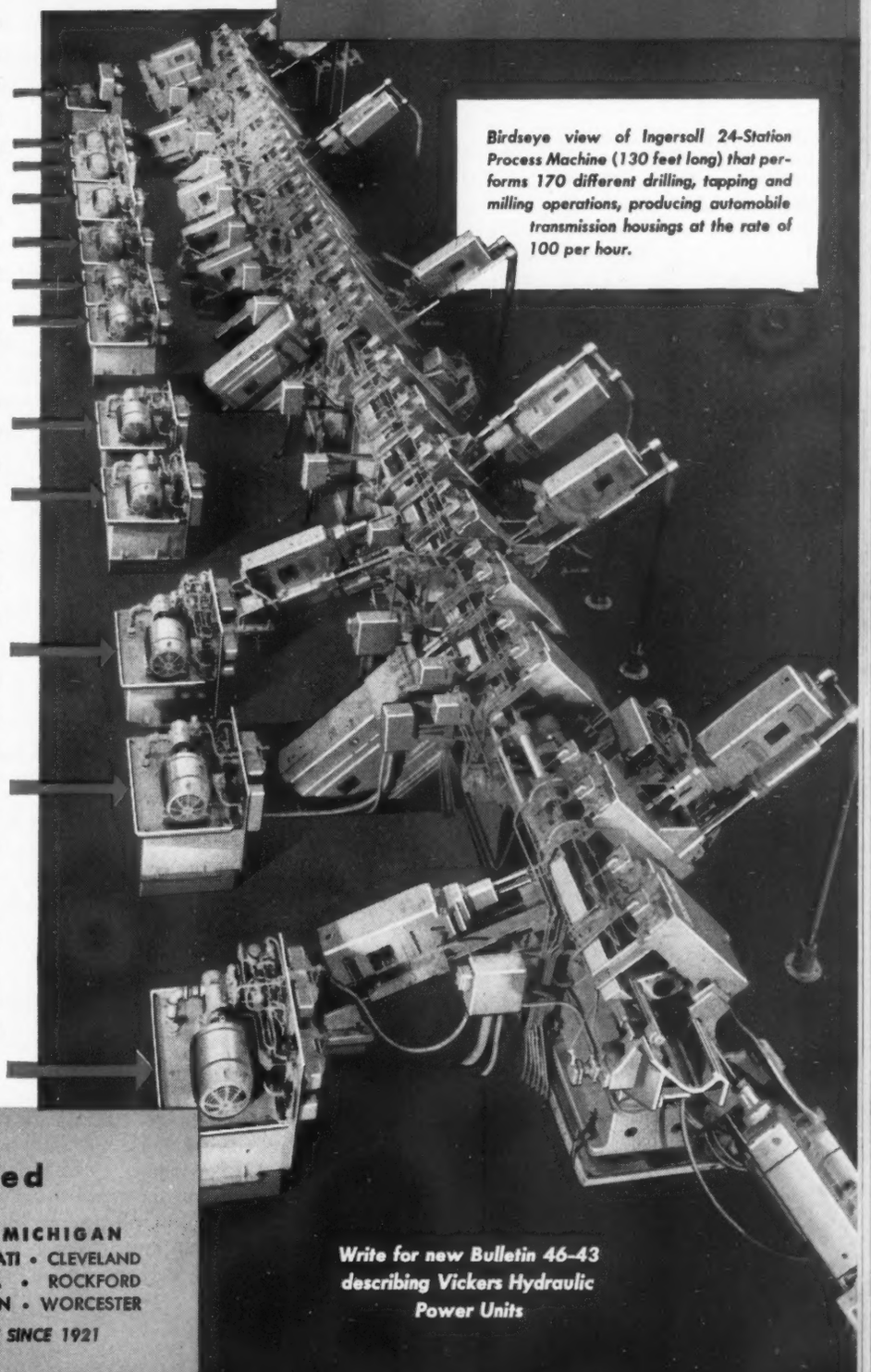

Birdseye view of Ingersoll 24-Station Process Machine (130 feet long) that performs 170 different drilling, tapping and milling operations, producing automobile transmission housings at the rate of 100 per hour.

Write for new Bulletin 46-43 describing Vickers Hydraulic Power Units

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

IHC Producing Small Tractors At Louisville

Manufacturing begins in wartime aviation plant acquired from WAA. Annual output of 50,000 expected

THE NEW, small, low-cost tractor announced almost two years ago by International Harvester Co., Chicago, for smaller family-sized farms heretofore without mechanical power, is now in production. Known as the "Farmall Cub," its manufacture is being carried on at the company's new Louisville, Ky., works. First shipments in quantity are being made to sales branches throughout the United States, from which they will be distributed to dealers.

Price of the tractor will be $545 f.o.b. factory. Attachments and implements are extra. This basic price, the company believes, will permit reaching the objective of providing the small farm with a tractor and a set of necessary accompanying implements such as plow, planter, cultivator, disk harrow and mower, to sell for less than $1000 at the factory.

Although the tractor was announced 18 months ago, it became a matter of acquiring manufacturing facilities to produce it, since it would be made in a volume too great to fit into any of the company's existing plants. The Louisville plant was purchased early in 1946 from WAA after being operated during the war by the Curtiss-Wright Corp. as an aviation plant. Company paid $6,700,000 for the plant, and has invested additional funds in plant enlargement and in tools and equipment.

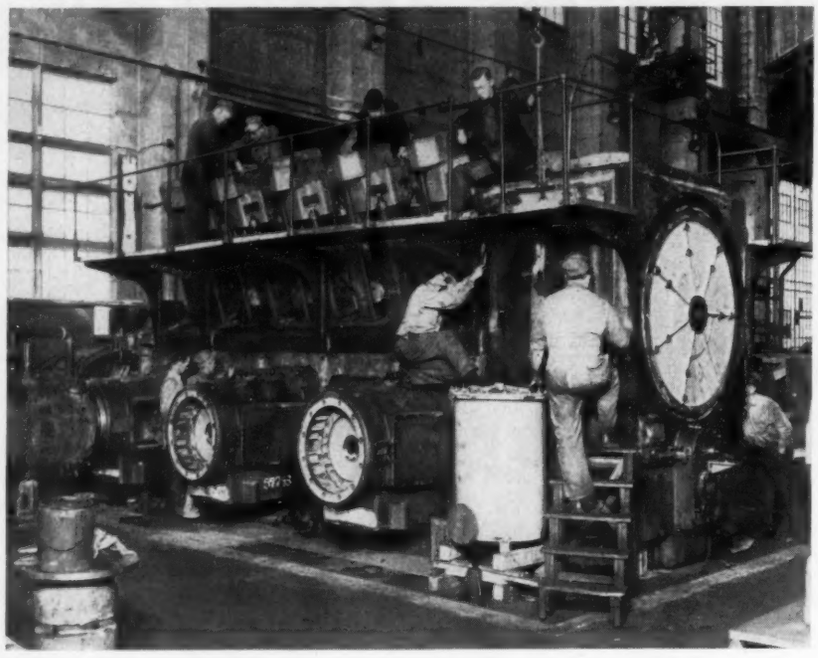
When full production is reached, sometime in 1948, output is expected to be at the annual rate of about 50,000 tractors.

Merger of Cliffs Corp., Cleveland-Cliffs Voted

Stockholders of the Cleveland Cliffs Iron Co., Cleveland, and of the Cliffs Corp., Cleveland, have approved a management-sponsored plan for consolidating the two companies into a new corporation bearing the name of Cleveland Cliffs Iron Co.

Cleveland Cliffs Iron Co. stockholders voted 785,202 shares in favor of the plan and 27,151 shares against.

Following the vote, a lapse of 20 days will be awaited to permit dissenting shareholders to file claims for establishment of a fair price for their holdings. Should the number of claims not exceed expectations, the merger, involving $92 million, would be declared operative in 28 days. Company has the right to declare the merger off if more than 5 per cent of either common or preferred shareholders seek cash.



LARGE COMPRESSOR: Size of this 2400-hp Cooper-Bessemer angle compressor may be judged by comparing it with the size of the workmen completing the assembly in the company's Mt. Vernon, O., plant. The compressor is one of five units purchased by the Panhandle Eastern Pipeline Co. for transmission of natural gas from Texas to Ohio's industrial sections. NEA photo

J & L To Spend $800,000 on Michigan Ore Mine Project

Jones & Laughlin Ore Co., subsidiary of Jones & Laughlin Steel Corp., Pittsburgh, has announced it will open the Vicar iron ore mine, located two miles east of Wakefield, Mich., and will spend $800,000 in the next three years on improvements.

The subsidiary has performed extensive drillings on the property. Largest item in the proposed $800,000 program will be the sinking of a 600-ft shaft.

Dietrich Bros. Celebrates 50th Anniversary in Steel

Dietrich Bros., Baltimore, structural, reinforcing and ornamental steel interest, is celebrating its 50th anniversary.

Andrew Jackson Dietrich began manufacturing bolts and nuts, and in the summer of 1896 was joined by his brother, Hammond, to form the present company whose business originally consisted of jobbing and manufacturing bolts, warehousing hot-rolled steel and jobbing nails.

During World War I the firm concentrated on structural portable construction and improved trusses and fastenings for interchangeable use in pontoon bridges and other military structures. Between the two wars, the company became increasingly a fabricator of construction steel, adding the specialty of ornamental iron work.

Hammond Dietrich died in 1913 and Andrew Jackson Dietrich in 1943. Today the firm is headed by the latter's two sons, H. Buckley and Horace W., president and executive vice president respectively.

Establishes Metallurgical Service in Pittsburgh

William B. Brooks has established a metallurgical consulting service in Pittsburgh and will specialize in consultation on stainless and heat resisting steels, materials engineering, industrial corrosion, low-alloy constructional steels, welding and the radiography of welds and castings.

Mr. Brooks studied metallurgy at Colorado School of Mines. He has served as assistant plant metallurgist, Allegheny Ludlum Steel Corp.; metallurgist for Stainless Steel Division, Carnegie-Illinois Steel Corp.; materials and welding engineer for Cramp Shipbuilding Co.; and has been associated with Alloys Development Co.

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Atlas Tool & Designing Co., Philadelphia, manufacturer of roller transmission chains, has changed its name to Atlas Chain & Mfg. Co.

—o—

War Assets Administration, Cincinnati, announces plans to offer by mail the machine tools remaining at the Wright Aeronautical Corp. plant at Lockland, O., where at a recent sale only about 300 of an inventory of 2380 tools were sold.

—o—

Electric Storage Battery Co. has sold its plant at 4613 S. Western Blvd., Chicago, to Barrett-Cravens Co., manufacturer of industrial trucks, for $425,000. The former company had recently acquired from WAA for $1 million a plant at 5333 S. Western Blvd.

—o—

Salem Engineering Co., Salem, O., manufacturer of industrial furnaces, has established an office at 512 Sinclair Bldg., Ft. Worth, Tex. Harris Pruitt will be in charge.

—o—

Glidden Co., Cleveland, manufacturer of paints, varnishes and industrial finishes, has instituted a program to provide group life insurance for its employees covering accidental death or dismemberment.

—o—

Aluminum Seal Corp., manufacturer of bottle caps and jar seals, will erect 35 prefabricated houses near its recently purchased plant at Richmond, Ind., formerly owned by Perfect Circle Co., piston ring manufacturer. Aluminum Seal is moving its headquarters to Richmond from New Kensington, Pa.

—o—

Association of American Railroads, Car Service Division, has changed its Detroit address to 420 Transportation Bldg., 131 W. LaFayette Blvd.

—o—

Superior Drawn Steel Co., Monaca, Pa., has purchased facilities adjacent to its own plant from WAA for $120,000. The property is dependent upon the Superior plant for utilities and would be incapable of independent operation without additional expenditures estimated at $75,000. Original cost was $282,602.

—o—

Bureau of Labor Statistics reports there are about 900,000 employed currently on machine shop jobs, a gain of 50 per cent over the 600,000 employed in 1940 before the war. The highest figure ever reported was 1,200,000 in December, 1943.

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Howard Engineering & Mfg. Co., Cincinnati, manufacturer of metal cleaning equipment, has appointed Bert Carpenter Co., Birmingham, Mich., as representative for Michigan and northern Ohio.

—o—

Kelsey Hayes Wheel Co., Detroit, has acquired Lathan Co. Inc., San Francisco, manufacturer of power brake equipment.

—o—

Black & Decker Mfg. Co., Towson, Md., manufacturer of electric tools, will open a factory service branch July 1 at Charlotte, N. C.

—o—

American Institute of Steel Construction Inc., New York, has moved its San Francisco office to 712 Mechanics' Institute Bldg., 57 Post St.

—o—

Air Reduction Sales Co., New York, manufacturer of industrial gases and welding supplies, has opened new plants in Decatur, Ill., and Baton Rouge, La. George H. Klingenber has been named superintendent of the Decatur facility, and J. L. West of the Baton Rouge factory.

—o—

Armour's Pattern Shop Co., Worcester, Mass., has changed its name to Armour-Porter Co. The same management and ownership continues.

—o—

Thomas Steel Co., Warren, O., has opened a district sales office in New York at 20 Pine St., with Hugh J. Smith in charge.

—o—

Wico Electric Co., West Springfield, Mass., manufacturer of magnetos, has opened a Milwaukee sales office at 208 E. Wisconsin Ave. Donald G. Forbes and Orville H. Tift will staff the office.

—o—

Emerson Electric Mfg. Co., St. Louis, maker of fans, motors and electric arc welders, has moved its Detroit office to 1375 E. Jefferson Ave. O. D. Metz is in charge.

—o—

Hardinge Co. Inc., York, Pa., announces that its San Francisco office has moved to 24 California St. The firm specializes in grinding mills, rotary dryers, kilns and other mining, smelting and chemical equipment.

—o—

Babcock & Wilcox Co., New York, manufacturer of steam generating equipment, has produced a motion picture showing fabrication, assembly and functioning of modern marine boilers. The 16 mm sound film, "Steam Power for American Sea Power," has a running time of 30 minutes.

—o—

Ryan Aeronautical Co., San Diego, Calif., announces development of a Navy interceptor fighter which uses both a jet and a propeller power combination to give it sensational climbing ability and a speed reported to be over 500 mph.

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American Steel & Wire Co., Cleveland, United States Steel Corp. subsidiary, will close all its finishing mills, including rod mills, for a vacation period, June 28 to July 14.

—o—

Westinghouse Electric Corp., Pittsburgh, announces electronic control engineering and sales sections have been formed in Buffalo to handle these activities for the corporation's Buffalo Divisions which include the Industrial Control Division, recently transferred from East Pittsburgh, Pa.

—o—

California Farm Production Council announces lowered prices on prefabricated steel sectional units which may be used for any farm purpose. The price for a 16 x 20 ft structure is $350 per unit, compared with a former price of $420.

—o—

Hagan Corp., Pittsburgh, combustion and chemical engineering firm, has moved its Cincinnati office to Temple Bar Bldg. George H. Larkin continues to head the staff.

—o—

Vascoloy-Ramet Corp., North Chicago, Ill., manufacturer of carbide tools and dies, announces that it is scheduled to operate at a maximum capacity during the summer months. It hopes to eliminate production lags by staggering vacations.

—o—

Inland Steel Co., Chicago, has licensed Youngstown Sheet & Tube Co., Youngstown, to manufacture Hi-Steel, a low alloy structural steel.

—o—

Standard Gypsum Co. of California, Oakland, Calif., has started production of gypsum lath and board at its new plant in Long Beach, Calif.

—o—

Monsanto Chemical Co., St. Louis, has awarded three of its industrial scientists with leaves of absence at full salary for an academic year of study at universities of their choice. The program was inaugurated last year when four Monsanto scientists received the awards.

The Business Trend

Steady Pace Maintained In Industrial Production

STEADINESS prevailed in industrial production during the week ended June 14 with a result STEEL's industrial production index registered 162 per cent of the 1936-1939 average. That level is one point above the preceding week and only two points below the postwar peak set in March.

Current industrial activity is reported being facilitated increasingly by improvement in the flow of materials and components. With the high rate of production, order backlogs in many instances are shrinking. In some cases the reduction of order backlogs is being hastened by a decline in new orders.

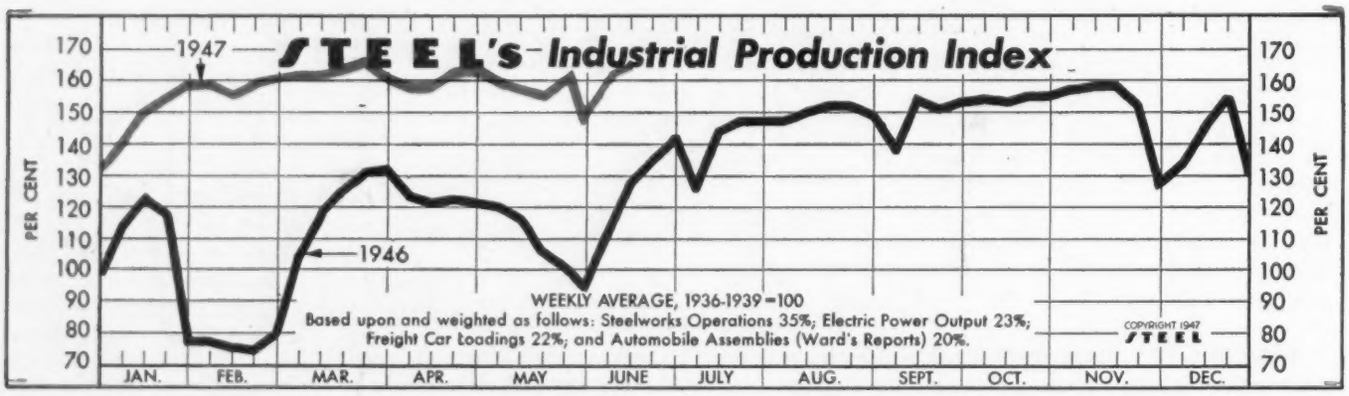
STEEL—Continued high production of steel is narrowing the gap between supply and demand, even in flat-rolled products where pressure for delivery has been the heaviest. However, outlook for continued improvement in the supply-demand balance is clouded by threats of a coal miners' strike in the near future.

COAL—As the date for a possible miners' strike drew nearer, output of bituminous coal jumped in the week ended June 7 to an estimated 13½ million tons, exceeded by only two weeks this year, weeks ended Jan. 11 and Feb. 1. Production in the week ended May 31 was 12,050,000 tons. Output this year through June 7 aggregated 277,202,000 tons, 78,455,000 tons or 39.5 per cent ahead of that for the corresponding period of last year.

CAR LOADINGS—The high coal production in the week ended June 7 helped push railroad freight loadings to 900,747 cars, greatest since the week ended Nov. 16, 1946. Of those 900,747 cars, 195,961 were loaded with coal, the latter figure being exceeded this year only in the weeks ended Jan. 11 and Feb. 1 when coal output exceeded that of the week ended June 7.

AUTOS—Held down by labor disputes, model changeover operations and materials shortages, automobile output in the week ended June 14 totaled an estimated 98,471 passenger cars, trucks and busses, compared with 98,499 in the preceding week. Commenting on the auto industry's performance, Ward's Automotive Reports estimate that for the first half of 1947 gross income of the industry in the U. S. and Canada should top $3.6 billion, wholesale value of all car, truck and parts sales. For all of 1941, last prewar year of normal operations and the record year for both income and production, the total was $4,721,000,000. Of course a substantial portion of the increased rate for 1947 is due to inflation in prices.

PRICES—Although nonagricultural prices declined slightly, prices for agricultural commodities continued to rise, with a result the U. S. Bureau of Labor Statistics wholesale price index for the week ended June 7 rose to 147.9 per cent of the 1926 average, compared with 147.4 per cent in the week ended May 31. The latest advance put the index 0.8 per cent above the level prevailing four weeks earlier.



The Index (see chart above): **Latest Week (preliminary) 162** **Previous Week 161** **Month ago 155** **Year Ago 128**

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.5	96.5	94.5	75.0
Electric Power Distributed (million kilowatt hours)	4,702	4,635	4,616	4,030
Bituminous Coal Production (daily av.—1000 tons)	2,250	2,008	2,175	2,124
Petroleum Production (daily av.—1000 bbl.)	5,113	5,064	5,008	4,961
Construction Volume (ENR—Unit $1,000,000)	$158.1	$121.1	$131.3	$138.9
Automobile and Truck Output (Ward's—number units)	98,471	98,499	83,201	50,206

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

TRADE				
Freight Carloadings (unit—1000 cars)	900†	901	888	868
Business Failures (Dun & Bradstreet, number)	66	66	88	12
Money in Circulation (in millions of dollars)‡	$28,253	$28,261	$28,134	$28,128
Department Store Sales (change from like wk. a yr. ago)‡	+7%	+12%	+13%	+39%

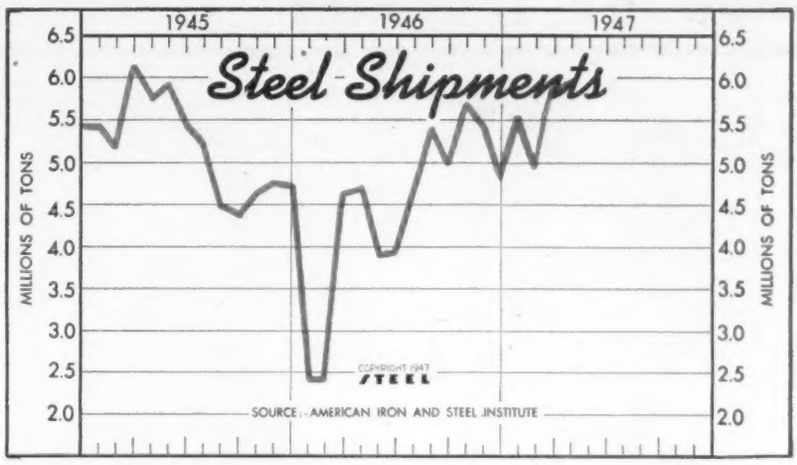
† Preliminary. ‡ Federal Reserve Board.

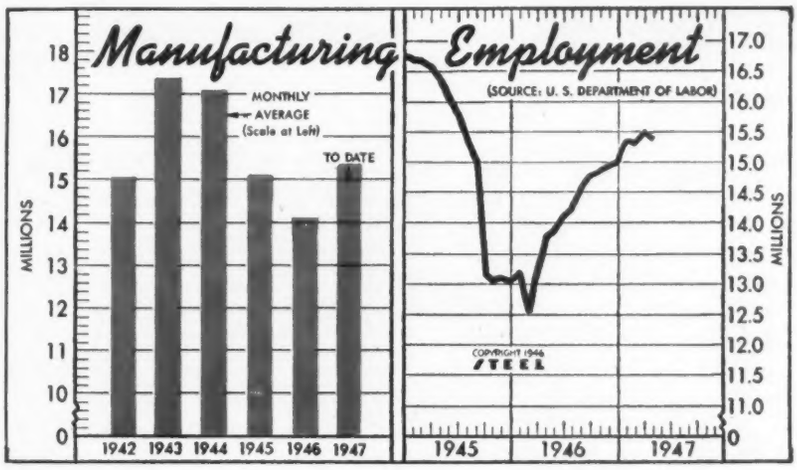
Steel Shipments

(Net Tons)

	1947	1946	1945
Jan.	5,527,753	2,391,850*	5,435,647
Feb.	5,015,934	2,391,849*	5,184,498
Mar.	5,798,461	4,644,988	6,179,452
Apr.	5,909,714	4,698,081	5,769,786
May		3,906,064	5,938,055
June		3,966,628	5,437,206
July		4,639,610	5,214,074
Aug.		5,406,470	4,512,637
Sept.		4,994,377	4,391,143
Oct.		5,675,339	4,660,237
Nov.		5,404,498	4,779,628
Dec.		4,854,207	4,729,561

* Figures for January and February, 1946, are merely averages derived from a report that combined shipments for those two strike-affected months into a total of 4,783,699 tons.





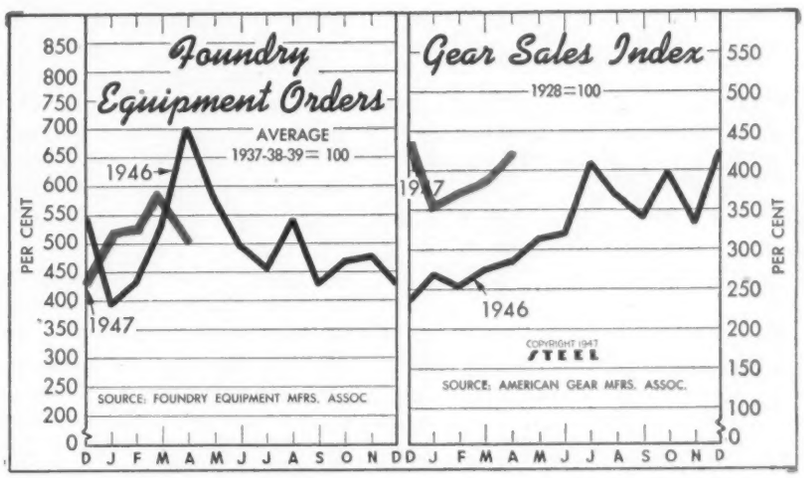
Factory Employment

(000 omitted)

	1947	1946	1945
January	15,372	13,499	16,696
February	15,483	12,751	16,684
March	15,512	13,433	16,557
April	15,373	14,045	16,302
May	.....	14,159	16,012
June	.....	14,371	15,749
July	.....	14,526	15,331
August	.....	14,876	15,019
September	.....	15,035	13,159
October	.....	15,064	13,048
November	.....	15,271	13,110
December	.....	15,348	13,059
Monthly Ave.	.....	14,365	15,060

Foundry Equipment Orders and Gear Sales

	Foundry Equipment Orders Index (1937-38-39=100)			Gear Sales Index (1928=100)		
	1947	1946	1945	1947	1946	1945
Jan.	513.4	392.8	422.4	350	269	323
Feb.	521.9	432.8	465.3	376	253	331
Mar.	573.8	536.6	604.7	380	275	339
Apr.	512.1	701.2	325.0	424	284	296
May	....	577.3	404.7	...	313	309
June	....	491.7	375.4	...	321	271
July	....	453.4	411.7	...	407	264
Aug.	....	538.7	532.2	...	368	205
Sept.	....	424.4	577.2	...	342	213
Oct.	....	469.2	457.8	...	397	251
Nov.	....	477.4	416.6	...	336	255
Dec.	....	430.9	547.6	...	425	239
Ave.	....	493.9	461.7	...	332	275



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,751	$11,296	$12,171	$11,395
Federal Gross Debt (billions)	$257.4	$257.5	$257.7	$271.2
Bond Volume, NYSE (millions)	$15.6	$13.8	$21.7	$25.3
Stocks Sales, NYSE (thousands)	4,560	3,209	6,138	5,192
Loans and Investments (billions)†	$54.6	$54.9	$55.0	$63.3
United States Gov't. Obligations Held (millions)†	$33,843	$34,479	$34,544	$45,222

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.82	$64.45
All commodities†	147.9	147.4	146.7	111.5
Industrial Raw Materials†	161.8	161.1	160.1	125.5
Manufactured Products†	142.9	142.5	141.9	106.6

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

RALPH V. DAVIES

FRANK M. BEAUREGARD

WALLACE B. HUNTER

Ralph V. Davies, Robert B. McKee, and **Donovan Wilmot,** assistant general sales managers for the Aluminum Co. of America, Pittsburgh, have been promoted to vice presidents of the company. Mr. Davies will also become general sales manager for the Aluminum company, succeeding **George J. Stanley,** vice president and general sales manager, whose retirement July 1 was announced last week. Mr. Stanley had been associated with the company for 42 years, serving in both sales and engineering capacities.

—o—

Seward H. French Jr., Pittsburgh attorney, has been appointed assistant to the president of Crucible Steel Co. of America, New York, in charge of industrial relations. Mr. French had previously assisted the company in legal matters relating to labor relations.

—o—

George W. Starr, vice president-sales, who has had charge of sales for Ohio Ferro-Alloys Corp., Canton, O., since its inception in 1928, will confine his sales work to a trade territory which can be handled from his home in Poland, O. **James C. Vignos,** also long in service of the corporation, will assume charge of sales in the Canton office.

—o—

Rudolph Furrer, vice president in charge of engineering, A. O. Smith Corp., Milwaukee, has resigned to accept a position with the American Car & Foundry Co., New York, as vice president in charge of research and engineering.

—o—

Alfred T. Alden, president of Pacific Chemical Co., Los Angeles, has been appointed general sales manager of Ellinwood Industries, Los Angeles. Heretofore, Ellinwood Industries' three divisions operated under individual sales managers. The sales manager of the Farm Equipment, Engine, and Electronics Divisions throughout the country will now report directly to Mr. Alden. **Robert S. Furst,** formerly vice president of the company and sales manager of the Farm Equipment Division, has resigned to establish his own business as a manufacturers' agent.

—o—

Frank M. Beauregard has been elected a vice president, in charge of operations, of Mullins Mfg. Corp., Warren, O. He has been operating manager of the company's plants in Salem and Warren, and will continue to direct the company's manufacturing activities. He previously had been connected with the Willys-Overland Co., Toledo, O., and Crosley Corp., Cincinnati.

—o—

Hugh J. Fraser, vice president of the International Nickel Co. Inc., New York, has been placed in general charge of all plant operations of the company in the United States. **John A. Marsh,** assistant general manager of the Huntington, W. Va., works of the company, has been appointed Mr. Fraser's assistant, with the title of assistant to the vice president.

—o—

J. V. Donohue Jr., sales representative in the Philadelphia territory for Schick Inc., Stamford, Conn., has been appointed sales promotion manager.

—o—

C. S. Larsen, Pacific Coast manager at San Francisco for the Wheeling Steel Corp., Wheeling, W. Va., has been appointed assistant manager of the New York sales office. Mr. Larsen spent four years in the Pacific Coast office, and returns east where he had been associated with the company for 21 of his 25 years' service. He is succeeded in San Francisco by **K. P. House,** formerly sales representative in the Chicago district, and located at St. Paul.

—o—

Wallace B. Hunter has been appointed senior contracting manager of the Chicago district for American Bridge Co., U. S. Steel Corp. subsidiary. In this newly created position, he will be in charge of all contracting work of the company in the Chicago district, including the contracting sub-office at Gary, Ind. **Newton O. Holt** will continue as contracting manager, Chicago district.

—o—

William F. Bottiglia has been appointed general manager of the J & E Tool Co., East Orange, N. J. Mr. Bottiglia has been affiliated with the company in the capacities involving material control, production control and business administration.

—o—

John C. Lee has resigned as president of Menasco Mfg. Co., Burbank, Calif. He will remain as a member of the board of directors, and will be retained through the firm of Executive Research Inc. to work on sales and related activities for Menasco.

—o—

O. L. Pringle, vice president in charge of operations for Columbia Steel Co., U. S. Steel Corp.'s West Coast subsidiary, has been selected to represent the Carnegie Institute of Technology at the inauguration of **Robert E. Burns** as president of the College of the Pacific at Stockton, Calif.

—o—

The following officers have been elected by the board of trustees of the St. Joseph Lead Co., New York: **Clinton H. Crane,** chairman of the board; **Andrew Fletcher,** president; **Irwin H. Cornell,** vice president and sales manager; **C.**

HARPER fastening NEWS

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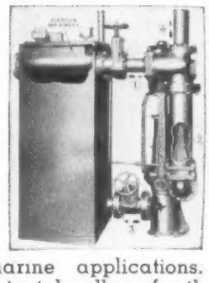
NON-CLOGGING MARINE PUMP UTILIZES CLEVER DUPLEX ARRANGEMENT



The problem of handling waste material on shipboard and preventing clogging in overside disposal has been solved neatly by a large manufacture of pumps for all marine applications. The self-flushing principle allows for the straining of solids from solution during an idle cycle of one unit while the other unit pumps. Then the latter unit idles while the former unit pumps, reversing the flow through the strainer and pumping the collected solids overboard. No solids are permitted to reach the pump impeller or clog the circuit. Thus constant discharge is maintained.

Since the waste solutions contain many highly corrosive organic and inorganic substances, basic materials, parts and fastenings used in the pump and fittings must be carefully selected.

Harper Bronze Bolts and Nuts are used to fasten casings and housings where reliable strength and corrosion resistance are required.

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Merrill Chapin Jr., vice president; Edward V. **Peters,** vice president; **Francis Cameron,** vice president; **George I. Brigden,** vice president and treasurer; **Robert Bennett,** secretary; **Charles Fleig** and **James G. Colvin,** assistant treasurers and assistant secretaries.

—o—

F. W. Mesinger, vice president, Norma-Hoffmann Bearings Corp., Stamford, Conn., has been elected to the board of directors of the company. He has been with the corporation 28 years, and is in charge of sales.

—o—

Douglas M. Lyon has been appointed sales manager of the Porter-Cable Machine Co., Syracuse, N. Y., to succeed **H. L. Ramsay,** who has been made vice president in charge of merchandising.

—o—

Changes in the lamp department, Nela Park, Cleveland, of General Electric Corp., Schenectady, N. Y., include discontinuance of the department's Eastern and Western Sales Divisions in favor of two newly created sales divisions—one the General Sales Division, the other the Sales Operation Division. Simultaneously announced are the promotions of several lamp department personnel: **N. H. Boynton,** general sales manager, G. E. Lamp department's Western sales districts, will join the staff of the Administration Division at Nela Park. **P. D. Parker,** general sales manager of the lamp department's Eastern Sales Division, has become general sales manager of the General Sales Division in the new setup. **Fred J. Borch,** manager of the lamp department's General Service Division, has been appointed manager of the newly created Sales Operation Division. **D. A. Hopper,** manager of the lamp department's Newark Service District at Newark, N. J., will succeed Mr. Borch as manager of General Service Division.

—o—

Robert B. Swope, president and general manager of the Southern Oxygen Co. Inc., Washington, has been elected president of the International Acetylene Association. He has served as vice president of the association. **J. J. Lincoln Jr.,** director of sales services, Air Reduction Sales Co., New York, has been elected vice president of the association, and **H. F. Reinhard** and **Philip Kearny** were re-elected secretary and treasurer, respectively. New directors elected were **Glenn O. Carter,** the Linde Air Products Co., New York, former president of the association; and **L. R. Cartier,** Independent Engineering Co., O'Fallon, Ill.

—o—

The International Acetylene Association has awarded the 1946 Morehead Medal to **Harry A. Campbell,** chief inspector, Bureau of Explosives, Association of American Railroads, for able administration of regulations for efficient and safe packaging and shipment of acetylene and related products.

—o—

Harold G. Gamble, sales manager of Standard Heater & Oil Equipment Co., Jersey City, N. J., has been elected vice president.

—o—

Donald M. Meeker, Paraffine Cos. Inc., New York, has been elected president of the Purchasing Agents Association of New York. Other officers elected are: **Donald H. Lyons,** Johns-Manville Corp., New York; **Stanley W. MacKenzie,** United States Rubber Co., New York; and **Curran Ridout,** International Standard Electric Corp., New York.

—o—

All American Industries Inc., New York, owners of the Fitzsimons Steel Co., Youngstown, announces retirement of **Archil Loyer,** president, and **R. E. Fitzsimons,** vice president. **Kenneth M. Smith,** vice president of All American Industries Inc., has been appointed president of the Fitzsimons Steel Co., and **Robert C. Hardy,** president of All American Industries Inc., will assume the office of chairman of the board of the Fitzsimons company.

—o—

Harry P. Henderson has been appointed general supervisor of methods and plant layout for the Bristol, Conn., plant, New Departure Division, General Motors Corp. **Ernest F. Morris** and **Oscar P. Liebrich** are appointed assistants to the Bristol factory manager, **A. F. Herold. E. W. Bolduc** has been appointed assistant to the director of inspection, **R. E. Young.**

—o—

Announcement has been made by the Samuel G. Keywell Co. Inc., Detroit, of the opening of its Pittsburgh office in the Jenkins Arcade Bldg. under the personal supervision and management of **E. Clyde Grimm.** Mr. Grimm had formerly been connected with the Crucible Steel Co. of America, New York, in the raw materials department, from 1921 to 1943. He was recently elected to the executive board of the Pittsburgh chapter of the Institute of Scrap Iron & Steel.

—o—

Louis C. Aicher has been elected chairman of the Milwaukee section of the American Institute of Electrical Engineers. He is in the transformer section of Allis-Chalmers Mfg. Co., Milwaukee.

—o—

W. Fosh Dew has been appointed sales manager, Clearing Machine Corp., Chicago. He had been assistant sales manager for the organization since he joined it in 1940. Previously he had been with the Toledo, O., Machine & Tool Division of E. W. **Bliss Co.**

—o—

William P. Quinn has been appointed superintendent of the steel finishing department of Pratt & Letchworth Co. Inc., Buffalo.

—o—

Arch B. Kirkwood Jr. has been named resident engineer at Buffalo for the Honan-Crane Corp., Lebanon, Ind., subsidiary of the Houdaille-Hershey Corp., Detroit.

—o—

H. H. Buckley has been appointed Pittsburgh district manager of the Hendrick Mfg. Co., Carbondale, Pa. He succeeds the late **Bruce G. Shotton.**

—o—

Dennistoun W. Ver Planck, professor of electrical engineering, Carnegie Institute of Technology, has been named head of the department of mechanical engineering and professor in that department. He assumes the position last held by **Willibald C. L. Trinks,** former mechanical engineering head, who retired in 1943.

—o—

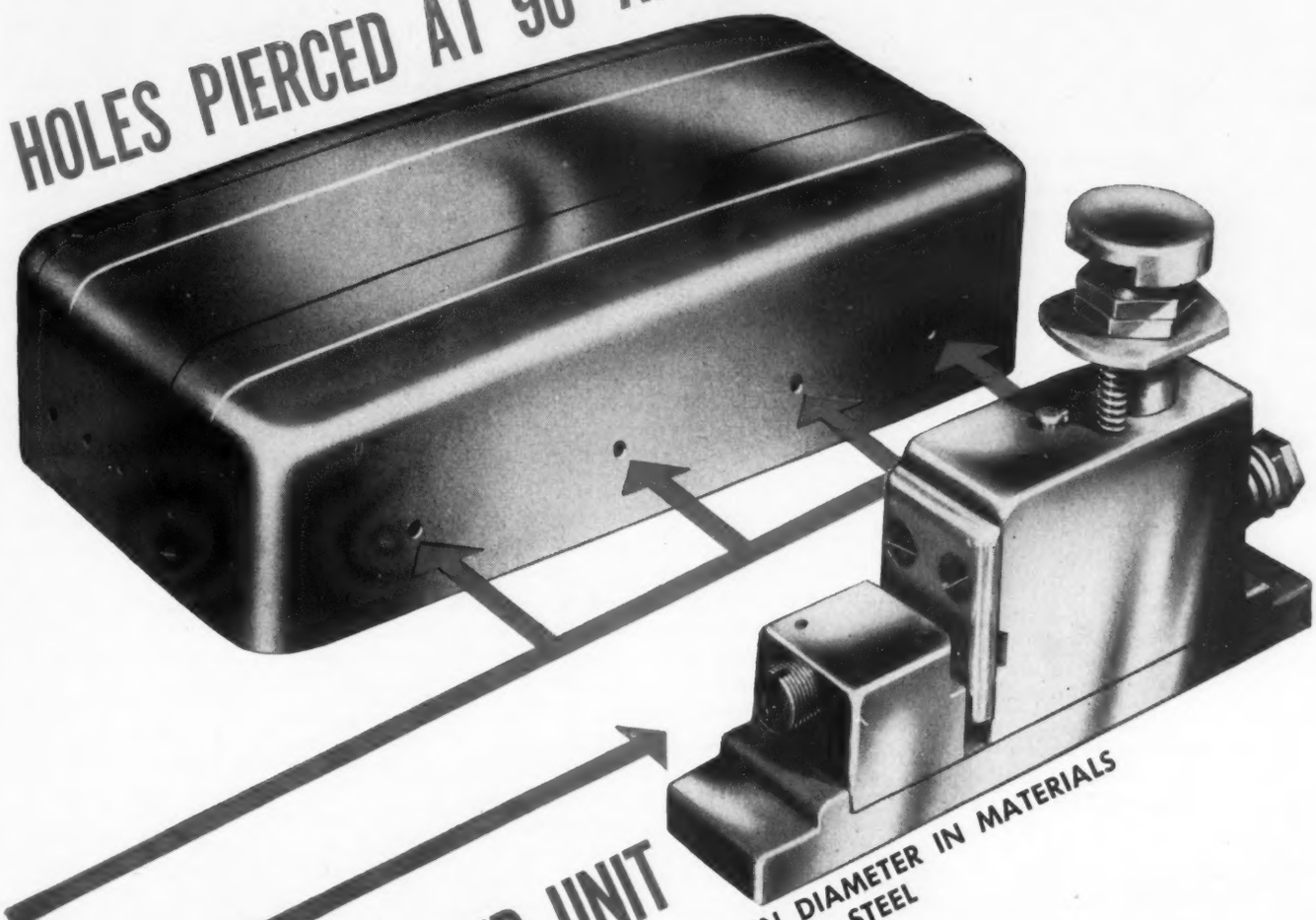
W. E. Mullestein has been appointed manager, field sales, for Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld Inc., Coatesville, Pa. He succeeds the late **Arthur J. O'Leary.** Mr. Mullestein has been manager of the Coatesville district sales office of Lukens, By-Products and Lukenweld since 1945.

—o—

The Wire Association has elected the following officers for the 1947-48 term: **R. M. Hussey,** Jones & Laughlin Steel Corp., Aliquippa, Pa., president; **Leroy D. Seymour,** John A. Roebling's Sons

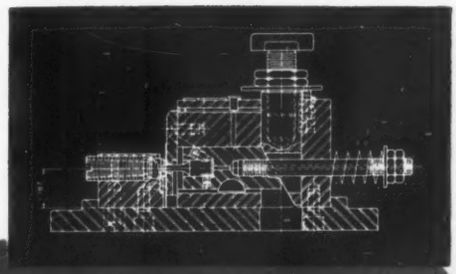
W. E. MULLESTEIN

HOLES PIERCED AT 90° ANGLE...

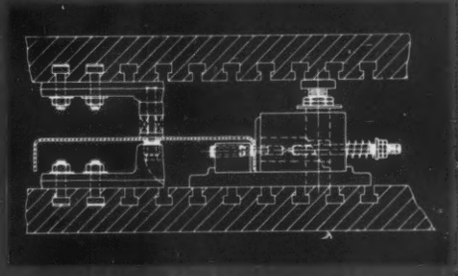


with NEW WHISTLER UNIT

PERFORATES HOLES UP TO 1/2" IN DIAMETER IN MATERIALS TO 1/16" THICK MILD STEEL



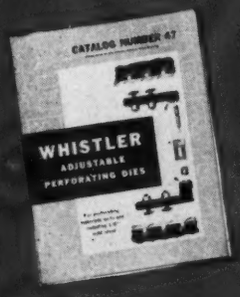
Detailed drawing showing operation of HU-50 90° Perforating Unit.



Typical set-up shows 90° perforating unit operated in conjunction with standard perforating equipment.

Extruded shapes, ells, angles and other molded, shaped or fabricated pieces are easily pierced from the side at 90° with HU-50 Perforating Units. Quickly set up and adjustable, these units may be used separately or with standard perforating equipment. The advantages provided by other Whistler Adjustable Dies are retained. Absolute accuracy is assured. Quick change-over of hole arrangements can be made ... in many cases, on the press. Production economies and speeded up operating schedules are effected. Continued re-use of units in different groupings spreads initial cost.

It makes sense to look into the use of Whistler Adjustable Dies for all perforating, notching, slitting or rounding operations.



DETAILS EXPLAINED IN CATALOG NO. 47

Get the facts about this 90° perforating unit in a hurry. Your copy of this catalog will be sent at once upon request.

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756 MILITARY ROAD BUFFALO 17, NEW YORK

Co., Trenton, N. J., vice president, Ferrous Division; **H. B. Carnahan,** Canada Wire & Cable Co. Ltd., Toronto, Ont., vice president, Non-Ferrous Division; and **Richard E. Brown,** publisher, *Wire and Wire Products,* Stamford, Conn., secretary and treasurer.

—o—

The Driver-Harris Co., Harrison, N. J., has elected the following officers: President, **Frank L. Driver Jr.;** executive vice president and treasurer, **Stanley M. Tracy;** vice president and secretary, **Ernest A. Harleman;** vice president, **Harry D. McKinney;** vice president, **George A. Lennox;** assistant vice president, **Joseph B. Shelby;** assistant vice president, **Francis E. Bash;** assistant treasurer, **Albert N. Knapp Jr.;** treasurer pro tem, **Joseph Kahrs;** assistant secretary, **Mildred W. Clark.**

—o—

Bradley Dewey, president of the Dewey & Almy Chemical Co., Cambridge, Mass., has received the Medal of Merit, one of the nation's highest awards, for his outstanding services to the United States as Deputy Rubber Director from 1942 to 1943, and as rubber director from '43 to '44, and for his services as chairman of the Guided Missiles Committee of the joint chiefs of staff.

—o—

Adrian D. Joyce, chairman of the board of the Glidden Co., Cleveland, has been awarded an honorary Doctor of Engineering degree at Case School of Applied Science, Cleveland.

—o—

Blake D. Hull, chief engineer, Southwestern Bell Telephone Co., St. Louis, has been elected president of American Institute of Electrical Engineers. The other officers elected are: Vice presidents, **G. W. Bower, J. H. Berry, I. M. Ellestad, D. I. Cone, D. G. Geiger;** directors, **W. L. Everitt, A. C. Monteith, Elgin B. Robertson;** treasurer, **W. I. Slichter.**

—o—

John E. Canaday, director of public relations, Lockheed Aircraft Corp., Burbank, Calif., has been elected chairman of the national Public Relations Advisory Committee of the Aircraft Industries Association, to succeed **Joseph E. Lowes Jr.,** Fairchild Engine & Airplane Corp., New York.

—o—

J. C. Rankin has been promoted to the position of manager of specialty sales for the Glidden Co., Cleveland. **R. P. Morris,** for several months acting coordinator of retail stores, has been appointed to that position.

—o—

Howard L. Ginaven has been appointed general superintendent of Goodyear Tire & Rubber Co.'s plant in Wolverhampton, England. He has been assistant to **G. K. Hinshaw,** vice president and production manager of the company's foreign operations.

—o—

Dr. William M. Murray Jr., acting head of the Engineering Division of the Southern Research Institute, Birmingham, has been appointed assistant director of the institute. He is succeeded in the Engineering Division by **Dr. C. R. Freeberg.**

—o—

James B. Cook has been appointed president and general manager of the Kloster Steel Corp., Chicago. He has been associated with the corporation for the past 18 years, serving as metallurgical engineer and in charge of sales.

—o—

Archie S. Ray, roller foreman of the Brier Hill round mill, Youngstown Sheet & Tube Co., Youngstown, has been appointed assistant superintendent of the Brier Hill blooming and round mills. He succeeds **Melvin Shaulis,** who became superintendent earlier in the year.

—o—

Benjamin B. Frost has been appointed sales engineer, Iron & Steel Division, Arthur B. McKee & Co., Cleveland. He will assist **Merrill Cox,** sales manager of the division. **Robert E. Touzalin,** formerly Mr. Frost's assistant, will succeed him as service engineer.

—o—

L. R. Boulware, vice president, General Electric Co., Schenectady, N. Y., has been assigned to covering company policy pertaining to employee relations. He succeeds **E. D. Spicer,** also a vice president of the company, who will now be in charge of the company's manufacturing policy, continuing as a member of the president's staff.

—o—

Richard L. Brummage, controller of Dresser Industries Inc., Cleveland, has been appointed to head the Cleveland Control of the Controllers Institute of America. He succeeds Phillip W. Scott, Bryant Heater Co., Cleveland. Other new officers of the Cleveland Control include **Ralph H. Smith,** Cleveland Electric Illuminating Co. as vice president, **George C. Houck** of Harris-Seybold Co., Cleveland, as secretary, and **Hallie J. Ensign,** Willard Storage Battery Co., Cleveland, as treasurer.

—o—

R. C. Allen has been appointed manager and chief engineer of the newly created turbo-power development department of the Engineering Development Division of Allis-Chalmers Mfg. Co., Milwaukee. He was formerly manager and chief engineer of the steam turbine department and directed many of the war projects in which Allis-Chalmers participated, including the production of turbochargers for planes.

—o—

T. O. Armstrong has been appointed director, plant labor relations, Westinghouse Electric Corp., Pittsburgh. He will be responsible for the co-ordination and direction of over-all plant training, safety and suggestion system programs and research work in the field of labor relations and training.

—o—

R. Herbert Knapp has been appointed chief engineer, H. C. Frick Coke Co., subsidiary of U. S. Steel Corp., New York. He has been serving as mining engineer for the company.

—o—

Lowell O. Gill has been appointed assistant technical director of the A. E. Staley Mfg. Co., Decatur, Ill. **Dr. Paul R. Shildneck** has been appointed director of research for the company.

—o—

John W. Cruikshank has been named to head the Sales Division of the Wingfoot Homes Inc. plant at East St. Louis, Ill., subsidiary of Goodyear Tire & Rubber Co., Akron. He has been district manager for the Goodyear Aviation Products Division in Buffalo.

—o—

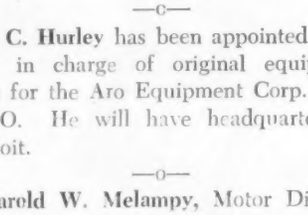
Theodore S. O'Konski has been appointed general manager of the Steelcrete factory of the Wheeling Steel Corp., Wheeling, W. Va., which is located at Beach Bottom, W. Va. He succeeds the late **L. W. Cross.**

—o—

J. C. Hurley has been appointed manager in charge of original equipment sales for the Aro Equipment Corp., Bryan, O. He will have headquarters at Detroit.

—o—

Harold W. Melampy, Motor Division superintendent of Delco Products Divi-



HARRY T. BURKE

Appointed assistant to general sales manager, E. W. Bliss Co., Detroit. Noted in STEEL, June 16 issue, p. 84.

FRANK C. HACKETT

Appointed sales promotion manager, Bell & Gossett Co., Morton Grove, Ill. Noted in STEEL, June 16 issue, p. 80.

WILLIAM A. ROBERTS

Appointed executive vice president, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee. Noted in STEEL, June 16 issue, p. 80.

WILLIAM C. JOHNSON

Appointed executive vice president, General Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee. Noted in STEEL, June 16, p. 80.

sion, General Motors Corp., Detroit, has joined Jack & Heintz Precision Industries Inc., Bedford, O., as superintendent of the Motor Division.

—o—

Harry Dobrin has been named president of Furnace Engineers Inc., Pittsburgh. Formerly executive vice president, Mr. Dobrin is one of the founders of the firm.

—o—

Arthur C. Martz has been appointed manager of sales of the American Screw Products Co., Detroit. He has been associated with the Brown McLaren Mfg. Co., Hamburg, Mich., for the past 22 years in various capacities, in recent years as assistant sales manager.

OBITUARIES . . .

W. King White, 45, a director of the Oliver Corp., Cleveland, died June 16. He had been president of the Cleveland Tractor Co. from 1929 until 1944 when it was merged with the Oliver Corp. The Cleveland Tractor Co. had been formed by his father, **Rollin H. White.** He was the grandson of **Thomas White,** founder of the White Sewing Machine Co., Cleveland.

—o—

Louis W. Kempf, 49, assistant director of research, Aluminum Co. of America, Pittsburgh, and inventor of a number of alloy processes, died June 14. He had been associated with the aluminum company for 23 years.

—o—

Lewis C. Walker, 71, chairman, Aeromotor Co., Chicago, died June 11 in Evanston, Ill. He had been associated with the company since 1893, serving as president from 1919 until his retirement last January.

—o—

Christopher H. Bierbaum, 83, vice president and consulting engineer in charge of research of the Lumen Bearing Co., Buffalo, died June 15 in that city. He was the inventor of the microcharacter, a device for studying the physical properties of the microscopic constituents of metals.

—o—

Charles Kirk, 43, executive vice president, International Business Machines Corp., New York, died suddenly in Lyons, France, June 16, while on a business trip with I.B.M. executives. He was a director and a member of the finance and executive committees of the International Business Machines Corp.

—o—

Frank C. Nieman, 71, former plant superintendent, Lamson & Sessions Co., Cleveland, died June 10. He had been connected with the company for over 59 years.

—o—

Harry A. Maurer, former general superintendent, director and secretary of the Oster Mfg. Co., Cleveland, died June 17. He had retired a year ago, and was retained by the company in a consulting capacity.

—o—

Albert E. Lange Sr., president of the Lange Pipe & Supply Co., Pasadena, Calif., died June 11.

—o—

Justus B. Entz, 79, electrical engineer and inventor of automotive devices and improvements, died recently.

—o—

Charles V. Crellin, 77, founder and former president of the Crellin Machine Works, Los Angeles, died recently.

—o—

Ralph L. Fox Jr., 26, associated with Naval Research Laboratory, Washington, was killed in the June 14 crash of a Capital Air Lines plane near Leesburg, Va. Mr. Fox was commissioned a lieutenant (jg) in the Navy and was stationed at the Naval Research Laboratory where he engaged in nonferrous metal research, specializing in copper-base alloy casting investigations.

—o—

Leonard W. Cross, 63, general manager of the Steelcrete factory of the Wheeling Steel Corp., Wheeling, W. Va., died recently.

—o—

Charles R. Austerberry, 48, partner in the J. C. Austerberry Sons, Detroit, and president of the Detroit Machine Dealers Association, died recently.

—o—

Levi H. Kellam, 83, who retired in 1944 as a partner of D. A. Hinman Co., Chicago, died recently.

—o—

Ben A. Tetzlaff, 61, for the past 20 years president, Wittek Mfg. Co., Chicago, died recently in Riverside, Ill.

—o—

W. Snowdon Smith, 90, former secretary-treasurer of the Cincinnati Rolling Mills, Cincinnati, died recently.

—o—

Martin L. Badhorn, 66, secretary-treasurer of the Automatic Voting Machine Corp., Jamestown, N. Y., died recently.

—o—

Walter D. Hodson, 77, president, Hodson Corp., Chicago, was killed June 14 in the crash of the Capital Air Lines plane near Leesburg, Va.

—o—

Frederick C. Brightly, 72, president, Standard Galvanizing Co., Chicago, died June 15 in Elmwood Park, Ill.

—o—

William A. Kemp, 55, vice president, Sundstrand Engineering Co., Rockford, Ill., died June 15.

BORING...

By GUY HUBBARD
Machine Tool Editor, STEEL

Part Three of a Series, and an Effort to Condense into Small Space the Big Story of Work Ranging in Diameter from a Fraction of an Inch up to 40 ft, as Handled on a Wide Variety of

MODERN MACHINE TOOLS

BORING, which in terms of machine shop practice means the enlargement and oftentimes the finishing of a hole already begun by coring, piercing, rolling, drilling or otherwise, is closely related to turning and drilling. Various kinds of lathes and drilling machines are used for boring—in many cases that being an important part of their work. Various kinds of boring machines likewise are used for drilling and turning—those being operations which many of them do in conjunction with and with equal facility to boring.

The earliest boring operations worthy of that name were those involved in the making of brass, bronze and cast iron cannon. These were cored castings, and being muzzle loaders, the bores were "blind"—that is, they did not go all the way through. Old engravings show them being bored in vertical position, the barrels being revolved by water power and the tools being gravity fed. The tools themselves were of multi-blade variety and actually were combination drills and boring tools, something like modern counterbores only much cruder in design and infinitely slower in action. Incidentally, it was not until the late 1700s that there was metalcutting carbon tool steel of any degree of dependability.

It is a rather surprising fact that the boring of big guns during World War II followed methods closely related to those evolved by old-time cannon founders. Although modern big guns are revolved in horizontal lathes instead of vertically, the work still is carried on and guided from the muzzle, even though the bores open through at the breech.

After using an ordinary overhung boring bar to start the bore at the muzzle, "packed bits" and "packed reamers"

with accurately sized oil-saturated wooden blocks guiding and backing up the cutting blades carry on from there. Each step in the bore serves as a guide or "jig bushing" for each following step right on through to the breech. The work is unhurried, but remarkable accuracy, straightness and fine finish are the inevitable results.

Since the end of the war, some of the makers of wood packed tools have been seeking to arouse industrial interest in this technique of deep-hole machining. They feel that it has possibilities on such jobs as long hydraulic cylinders which closely resemble gun tubes in material, size, dimensional limits and finish. If this technique does catch on commercially, it will be just one more of the numerous instances of "swords being forged into plowshares" in a postwar era.

In view of the considerable degree of perfection which cannon boring had attained long before the time of James Watt, it is hard to understand the trials and tribulations which that famous steam engineer went through when he attempted to get his first big cylinders bored about 1770. Even the well-known engineer John Smeaton told the Society of Engineers that the Watt engine was impractical because "neither the tools nor the workmen exist that can manufacture so complex a machine with sufficient precision."

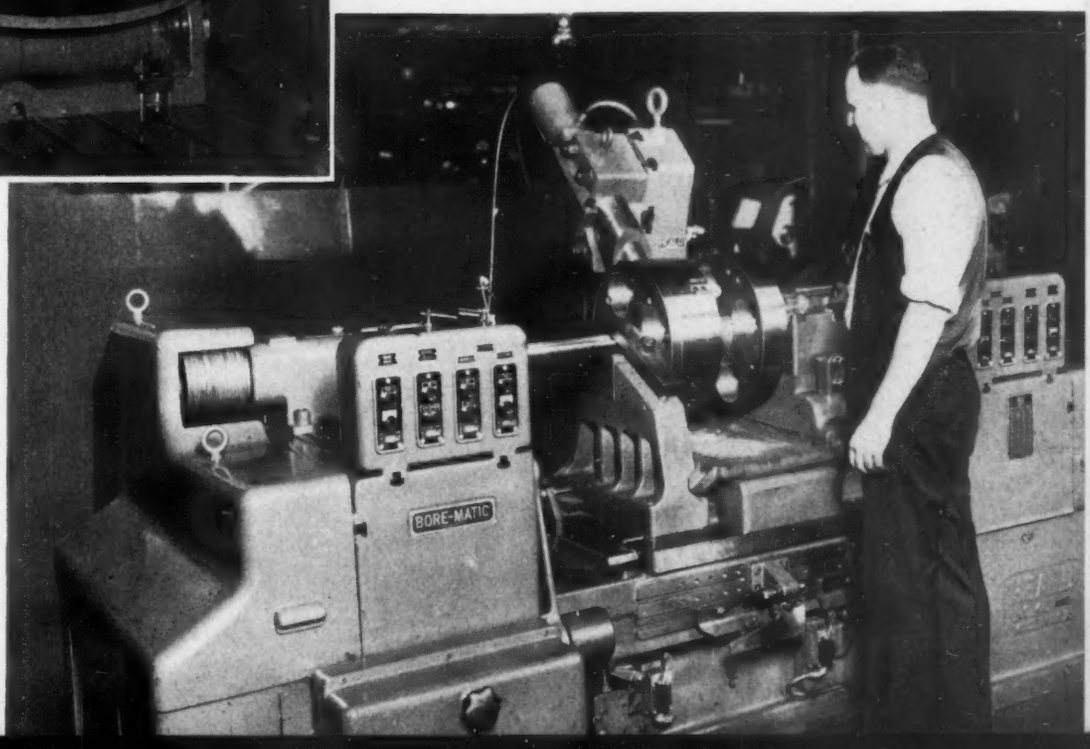
It took the hard-headed, practical shop man John Wilkinson of Bersham in 1774 to dream up the beautifully simple idea of using a heavy revolving boring bar running entirely through the open cylinder and supported in an outboard bearing at the further end. With that setup he bored cylinders 50 in. in diameter, which as the highly elated Watt reported, "err not the thickness of an old shilling in any part". Thus at one fell swope, John Wilkinson, machine tool builder, made the steam engine a practical prime mover and brought into being what today generally is called the horizontal boring, drilling and milling machine. There have been many improvements and variations in design since Wilkinson's time but Wilkinson's basic idea still underlies these universal and highly important "horizontal boring mills".

After a long period during which horizontal boring mills based on the Wilkinson idea were considered indispensable production machine tools, there came a day when they went into relative obscurity as tool room and customs shop equipment. That was only a passing phase, however. Within recent years machine tool designers, electrical engineers and tool engineers have done wonders with these machines in broadening their functions, speeding up their action, improving their control systems and providing a wide variety of ingenious tools and fixtures.

They very definitely have won a new lease on life in production shops as well as service shops—including railway and marine shops concerned with diesel engine work. These modern boring, drilling and milling machines are built in a wide range of sizes, the big ones being among the largest of all machine tools of standard design. Electrical drive and control make it possible for operators

Pratt & Whitney jig borer with tilting and indexing fixture, dividing and spot drilling a disk preparatory to precision boring

Heald double end machine specially designed for precision spacing and boring of holes in National Acme multiple spindle carriers



Gaging a cut during the process of machining one of the internal flanges of a huge fabricated steel generator frame on the boring mill with 40 ft table built by General Machinery Corp. and located at the Westinghouse Electric plant, East Pittsburgh

The number and variety of boring machines, many of which will be of entirely new design, and the number and variety of boring jobs, many of them involving tools, jigs and fixtures representing the last word in American tool engineering, will be a big surprise to all who attend the National Machine Tool Show in September.

Since the previous show sponsored by the National Machine Tool Builders' Association at Cleveland in 1935, precision location, rapid roughing and fine finishing of holes of every size has occupied the attention of many leading machine tool men and tool engineers. Improved tool materials have completely changed the outlook on boring speeds and feeds. Wartime problems have stimulated original thinking.

All these things will be brought to light at the Big Show in Chicago.

of these big machines literally to "ride on the cutting tools" on railed platforms where instant finger-tip control of all functions is provided by control panels or by pendant push button clusters.

In another major class of boring machines are vertical boring mills which were mentioned in my article on "Turning" in the June 9, 1947, issue of STEEL, as being direct descendants of the ancient potter's wheel, from which horizontal lathes actually are not quite as directly descended. These revolving table vertical boring mills were among the first really big machine tools ever built. Crude as they were, with granite foundations, timber frames and tools fed by hand screws, these primitive boring mills played highly important roles in building other large machines.

A modern and highly developed descendant of those old-time boring mills is the machine with 40 ft. table built during the recent war for the Westinghouse plant in East Pittsburgh, by General Machinery Corp., Niles, Ohio. This huge machine tool, which is the subject of the action photograph at the begining of this article, was one of the "vital spots" in our war production program and it is one of equally vital importance in America's program of peace time mechanization.

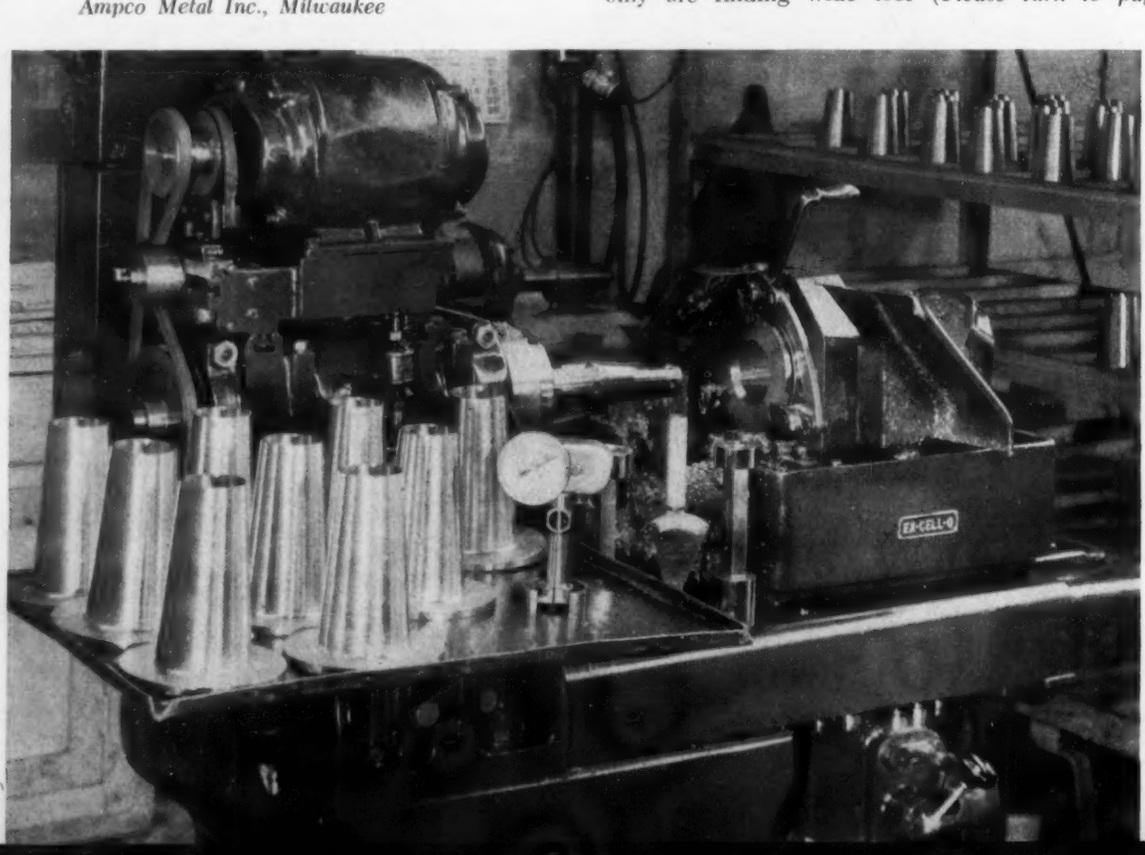
Since the turn of the century, the smaller vertical boring mills—I mean those which rest on the floor instead of requiring pits below floor level—have evolved into a very important and distinct type called vertical turret lathes. As now built, these machines will handle a large number of tools—turning, facing, grooving, forming, etc. as well as boring—in turrets and side heads. Carbide tooling is employed with marked success in the latest models, some of which have automatic control which can be "switched on" when repetitive work is to be done.

There is another class of vertical boring machines in which tools revolve and work tables can be traversed laterally and longitudinally with extreme accuracy. Auxiliary tables also permit indexing in several planes to equally high precision.

The first of these "precision jig boring machines" were of Swiss manufacture and a few of them appeared in American shops about the time of the first World War. They were—and in many cases still are—kept in the sanctum sanctorum of tool room or experimental department for use only on the most exacting work by highly trained specialists. Many of these machines still are being imported from Switzerland and they are beautiful examples of what human skill and patience can accomplish in a specialized field of machine tool building.

American machine tool builders in the meantime by no means have been idle in this field. Several of them have brought out successful jig boring machines which not only are finding wide tool (*Please turn to page* 141)

Single spindle Ex-Cell-O machine precision boring bronze propeller cones previously turned in similar machine at Ampco Metal Inc., Milwaukee



By C. CYRIL HALL
Research Department
Firth-Vickers Stainless Steels Ltd.
Sheffield, England

Stub shaft forgings in Stayblade steel

BRITISH High Temperature Steels

For Gas Turbines

ONE of the most interesting fields for research for both ferrous and nonferrous metallurgists is provided by the gas turbine. Progress made with this power unit is due in no small measure to the steels which have been developed.

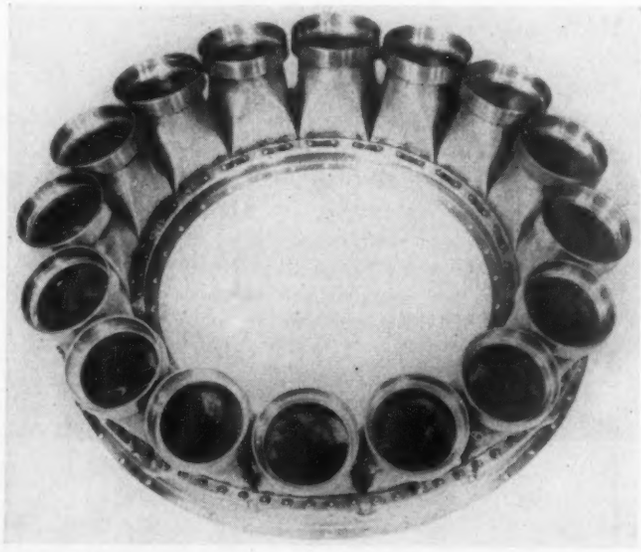
Heart of the gas turbine is the rotor assembly. It is in the provision of suitable materials for the rotor or disk and the rotor blades that the metallurgist's biggest problem lies. Rotor blades call for a combination of properties not encountered in any other engineering device. In the first place the temperature at which the blades operate is now generally about 700° C.

Properties required of a rotor blade are chiefly high resistance to oxidation and creep, and high fatigue strength at the elevated temperatures in question. It will be appreciated that the better the hot strength of a material, the more difficult does the production of the material become by normal forging and rolling operations. The only exception to this is in the case of castings; a material is simply cast to shape and therefore does not require any hot forming.

At the present time, gas turbine rotor blades are generally produced as drop-stampings from hot rolled or forged bar stock. Thus, it will be seen that high strength steels are well hot-worked in turning out the finished blade. Problems of manufacture are considerable.

Blades and disk of the first Whittle engine were made from Firth-Vickers' Stayblade steel in 1936. This steel was a development of Staybrite steel and was evolved primarily as a blade material for steam turbines. Chief characteristics of the steel for this purpose were excellent corrosion resistance coupled with higher tensile properties than those normally obtained in an austenitic steel.

Moreover, these properties were retained in large measure at steam temperatures. (*Please turn to Page* 132)



Junction pipe and nozzle assembly of the DeHavilland engine showing centrispun flange rings

TABLE I
TENSILE TESTS ON STAYBLADE

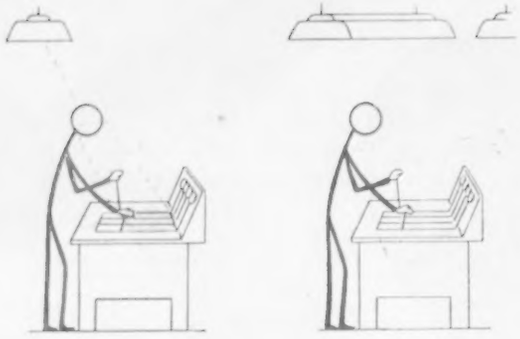
Temp.	Limit of Proportionality, T/sq in.	10 Per cent Proof Stress T/sq in.	Max. Stress T/sq in.	Elong. Per cent	Red. of Area Per cent
Room	8.8	24.2	48.7	34.5	56.5
100° C	13.5	25.2	41.8	34.0	58.5
200° C	12.2	23.8	39.0	27.5	56.6
300° C	14.3	25.1	37.6	25.5	55.0
400° C	13.7	26.2	35.9	25.0	55.5
500° C	7.5	24.3	34.4	25.5	56.5
600° C	5.3	20.6	27.6	30.5	62.0
700° C	....	....	18.8	32.0	62.0
800° C	....	....	11.3	44.0	69.0

These tensile specimens were pulled at the normal rate of 0.0085 in. min. up to 0.5 per cent proof stress and 0.125 in. min. thereafter. Ton=2240 lb

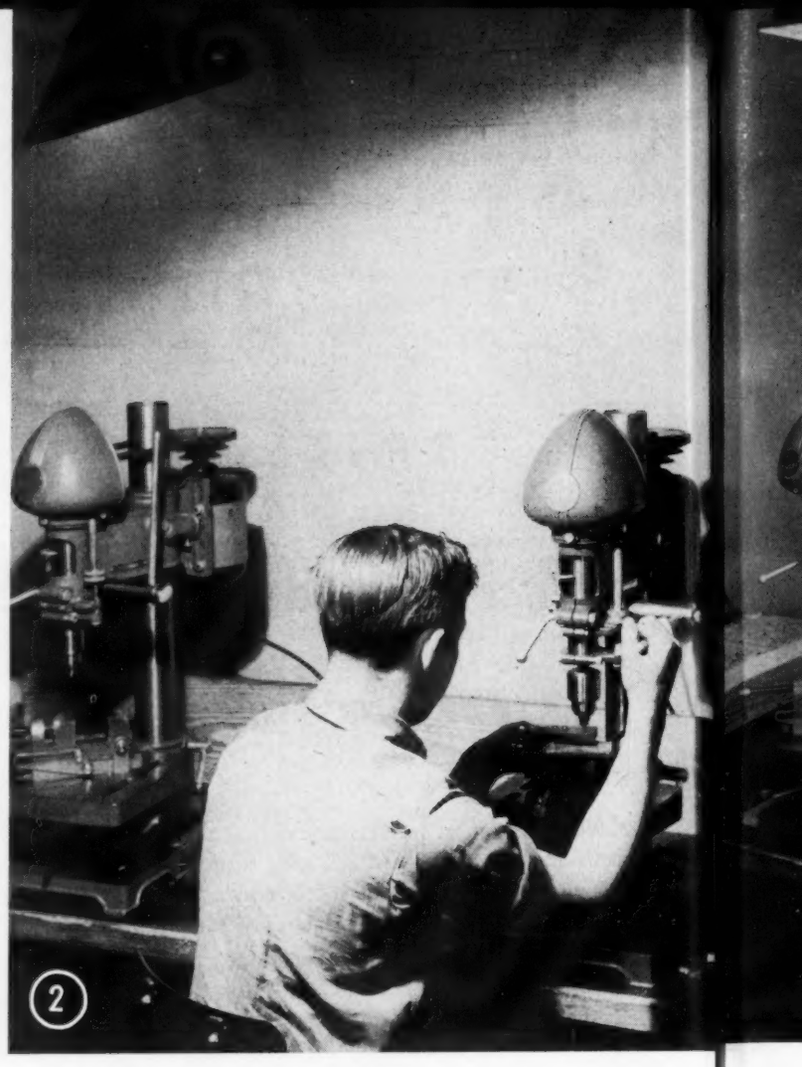
TABLE II
TENSILE PROPERTIES OF TRIPLE-TREATED R. EX 78

Temp.	Limit of Proportionality, T/sq in.	10 Per cent Proof Stress T/sq in.	Max. Stress T/sq in.	Elong. Per cent	Red. of Area Per cent
20° C	....	....	38.0	38.0	55.0
400° C	15.2	17.0	37.8	29.0	43.0
500° C	11.0	18.0	37.0	24.0	26.0
600° C	9.5	17.6	32.6	14.0	17.0
700° C	....	....	22.3	16.0	17.0
800° C	....	....	16.0	22.0	25.0

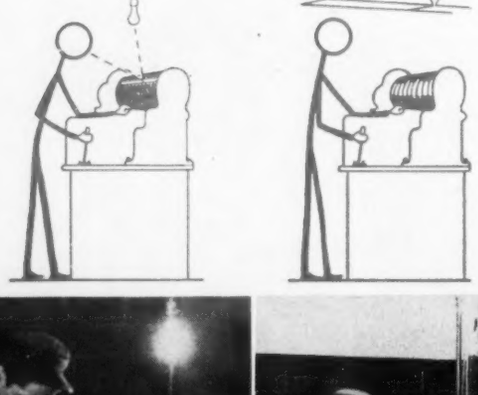
Ton=2240 lb

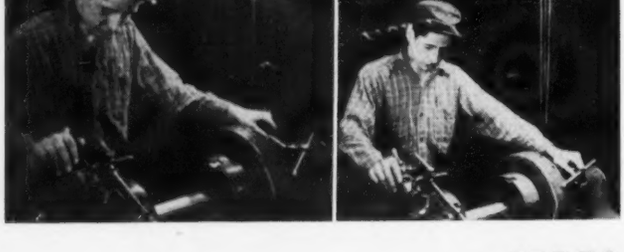


Obvious economic advantages to be gained by adequate plant illumination are sometimes overlooked in false cost-cutting. In this first section of a two-part article, costs of various lighting systems are analyzed and planned programs suggested to meet specific needs



HOW TO BUDGET *Industrial Lighting*





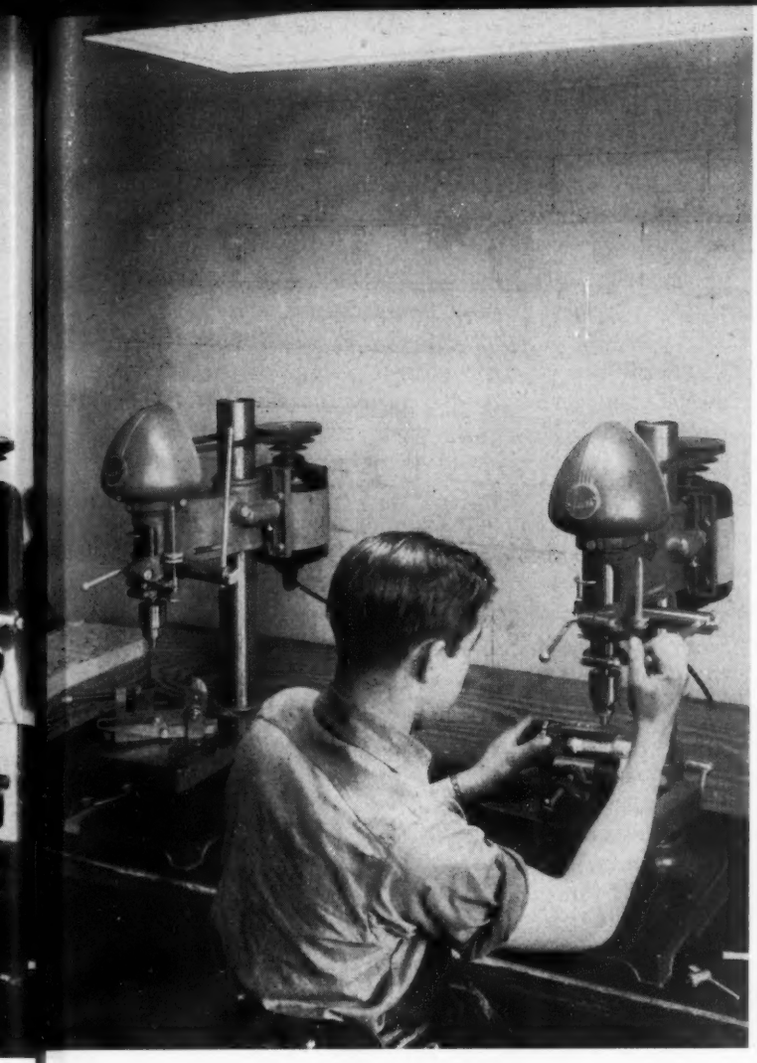


Fig. 1—Supplementary lighting has its place in industry, but should not be used exclusively. It should supplement general lighting to reduce bad contrast conditions which make for poor seeing

Fig. 2—Every worker knows the problem of "standing in his own light." Belts, beams, cranes and tool racks all aggravate this trouble

Fig. 3—Light reflected from curved work surfaces is concentrated by a point-light source. It can be minimized by shifting the lamp shading, diffusing or changing to a long light source

Costs

By J. C. FORBES and J. L. TUGMAN
Engineering Division
Lamp Department, General Electric Co.
Nela Park, Cleveland

WHAT is sound lighting practice for an industrial operation? How can it be evaluated apart from the actual dollars spent for lighting?

Answers to these questions cannot be given categorically and, except as lighting principles are better appreciated and utilized, the economy potential in good illumination for industry will not be adequately understood. How shall we go about getting this understanding which will give more sense to industry's lighting dollar?

To treat the question comprehensively, suppose you have a large plant with a wide variety of operations and you are disposed to give the benefits of improved lighting to the whole business. You have asked a specialist to give you his recommendations.

In the role of that specialist, we would tell you that the practical way to have good lighting throughout your plants is to develop a planned lighting program carefully studied for maximum contribution to plant efficiency, rather than the too common way of counting the costs first and seeing how much you can cut them.

Lighting is never a major item from any bookkeeping angle, seldom as much as 4 per cent of operatnig expense for a good system, usually less. The costs of poor lighting are usually as great and usually more, since the function of lighting is to make a factory a more efficient place in which to work, and to enable people to see how to do their work and to help them avoid accidents.

The simple lighting plan we would recommend for your various operations would first classify your plant space as manufacturing or storage. The manufacturing space we would further classify by type of seeing task in order to determine amount of light required for safe and easy seeing. Consideration must be given to the degree of detail to be seen, and the quality and quantity of light which will enable the worker to accomplish the job with a minimum of fatigue and a maximum of accuracy. General manufacturing is assumed in this case.

Next step is the recommendation of type of lightning equipment. Assuming general manufacturing and the type of seeing tasks usually incorporated in such an operation, a recommendation can be made from a practical point of view on the basis of indicated mounting heights. In the lighting schemes illustrated here, Fig. 4 shows a plan for lighting manufacturing areas with mounting heights less than 14 ft. Fig. 5 shows a plan for manufacturing areas for mounting heights of between 14 and 25 ft. Both plans call for continuous rows of fluorescent units, industrial type reflectors for two 40-w lamps in each, Fig. 4, and industrial type reflectors for two 100-w lamps in each for Fig. 5. Both arrangements are calculated to yield approximately 45 footcandles with a 70 per cent maintenance factor.

This assumes a reasonable maintenance plan. Without any maintenance other than replacement of outages the illumination would probably drop to 30 footcandles. These figures are important and we shall return to them later. Both plans provide lighting levels suitable for "general manufacturing" with an absence of harsh shadows, minimum glare and reflected glare.

In the third classification for manufacturing areas, where mounting heights are above 25 ft our plan would call for installations equivalent to (1) and (2) with higher-wattage lamps. There would be three choices of illuminant for these high mounting areas, the choice to depend upon factors special to the area considered. The three different types of installation are (a) staggered systems of alternate mercury and incandescent lamps, (b) incandescent lamps alone, (c) mercury lamps alone.

Table I compares costs for various lighting systems used in industry and provides the background for discussion of lighting as a tool and medium capable of multiplying the effectiveness of other, larger items of production expense. The table offers much information, item by item, which answers questions frequently asked by management. Reference to these data can yield informa-

tion independently of the main purpose of this article.

The quantity basis of comparison in no way implies that quantity of light is the most important criterion for selecting a lighting system. Of equal importance is the quality of the lighting. The selection of a particular lighting system should include consideration of minimizing dirt and reflected glare, elimination of harsh shallows, holding contrasts within comfortable limits and in some cases selecting a color quality suited to the color of the materials produced and the color treatment in the building in question.

Accordingly, the cost table covers three systems not interchangeable with respect to lighting performance or installation aspects such as mounting height and spacing. It is presented as a guide to a method for calculating your own costs.

So much for general plan for manufacturing areas. Now let us consider storage areas. Having regard for simplicity and unity in the overall plan, we shall consider fluorescent lighting for these areas. Calculations show fluorescent lighting can be used with economy in warehouse and active storage areas where the system is used for an 8-hour day with energy at a ratio as low as 1 cent per kilowatt-hour.

Continuous rows of fluorescent units are recommended on 20-ft spacing for such space. By omitting the lamps in every third unit, or leaving out the unit, 15 footcandles would be provided. In the event the warehouse was later changed to manufacturing area this system would simplify the conversion with respect to lighting, adding the lamps or units omitted, and by doubling the number of rows the system would correspond to the 10-ft centers recommended above in the consideration of manufacturing areas.

We started out to see what sound lighting practice could do for industry, and now we have a general plan as our first step in the direction of our goal. Let us take a look now at some of the pressing problems industry faces today as it strives to keep operating profitably.

Two phrases we hear frequently today embrace the chief problems of industry and point our thoughts towards solutions. One of these phrases is unit production cost; the other is increased plant capacity. Both are related to problems connected with labor. Unit production cost is largely concerned with the productivity per worker. Increased plant capacity brings up consideration of second and third shift operations and problems incident to attracting skilled workers to accept these shifts, in addition to plant layout and other factors incident to increasing capacity.

With respect to what the record shows about the way plant facilities can contribute to these objectives we recall the War Production Board's No. 1 recommendation for plant efficiency. Lighting was the facility named by WPB as a prime factor in promoting the objectives of production.

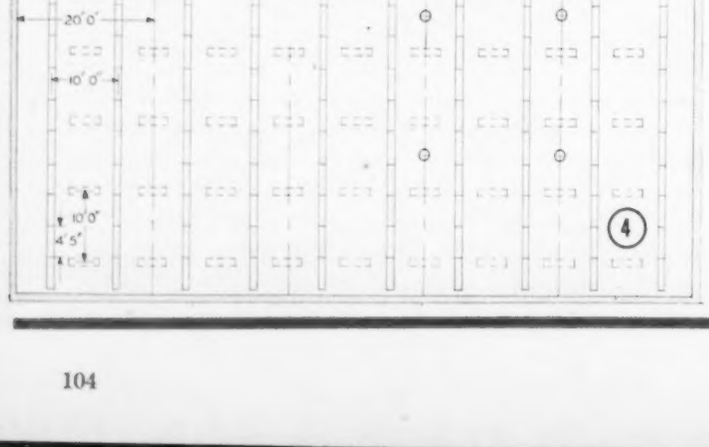
The urgent necessity for high volume production in a hurry was the basis for this emphasis. During the war industrial lighting received much more attention than ever before. This attention was long overdue and much needed. With unprecedented production schedules and with industry staffed largely with inexperienced help, the relation between lighting and output became more fully appreciated. The urgent need settled any argument.

New conditions have entered the industrial picture, complicating and confusing production plans. With shortages and delays dominating the early postwar conditions, it was natural that some of the things we had learned in the war should have been overlooked. With the prospect that certain elements of operating cost will remain high, and that adjustments in products and processes with respect to new materials or new methods will incur additional expense, we need to discover new ways to economy.

Everywhere in industry today we find management eager to find new routes leading to the goals of lower "unit production cost" and "increased plant capacity." In this connection we are reminded of a recent survey

Fig. 4—Light system for mounting heights under 14 ft. Continuous rows of industrial units, with two 40-watt fluorescent lamps per unit, the rows on 10 ft centers, provides 45 footcandles, average, in service. Additional lighting may be obtained by establishing grid pattern indicated on layout. Single length units add 50 per cent; double-length channel with two reflectors adds 100 per cent

Fig. 5—Designed for mounting heights from 14 to 25 ft, this layout uses continuous rows of industrial units, with two 100-w fluorescent lamps per unit, rows on 13 ft 4 in. centers, provides 45 footcandles in service. Additional lighting may be obtained by developing grid pattern indicated in Fig. 4



of industrial operations. Although the generally reported trend in the productivity per worker is lower than prewar, 37 per cent of the plants covered in the survey report a reversal of the trend with production as high or higher than prewar. A combination of three factors is given the credit in achieving this result. One of these is better machinery, another is better production methods. The third, and perhaps the most important is improved morale. All three speak for the all-time winning combination of superior equipment, know-how and team work.

With a good general lighting system it is possible to make the layout of machinery in accordance with any product movement. Conversely, the arrangement of a limited general lighting system, or an unfavorable layout of windows and monitors would impose a less efficient flow of product. This is a frequent instance of the way lighting may influence methods. Better lighting is a leading factor in better production methods.

Better lighting as it contributes to making the work easier to do, and the work environment conducive to doing it, becomes a key to increased plant capacity as an incident to its part in creating improved morale. Thus many plants that have or plan to have extra shift operations are confronted with the problem of attracting enough skilled men to the later shifts. Skilled men are usually older men wih poorer eysight.

The older, more skilled men usually have enough seniority to choose their shift, and they will not ordinarily choose the later shifts unless the inducements overcome the objections. When it is possible for them to earn as much or more on a later shift, which means working most effectively, the prospect of good environmental conditions added to the inducement may make them change their preference. The advantages to be gained by skilled labor distribution are worth going after since experience has shown that second and third shifts can be made just as effective as the day shift.

Better lighting is, of course, inseparable from the success of such programs. Simple labor shortages are likely to continue for some time, labor is likely to continue "choosey", except where it is influenced by factors which make its co-operation easy. The lighting cost in these factors is a small fraction of the potential return.

We can check the unit (*Please turn to Page* 135)

TABLE I

COST ANALYSIS OF INDUSTRIAL LIGHTING SYSTEMS

Item No.	FLUORESCENT Pre-Heat Start—40-Watt 8′ Section Open End Ind. Type Unit 4 40-watt F Lamps—118 volts		INCANDESCENT 1 1000-watt Incandescent Lamp Porcelain Enameled Reflector 120 volts		COMBINED MERCURY & INCANDESCENT 2 400-watt Mercury Lamps 1 1000-watt Incandescent Lamp Porcelain Enameled Reflectors	
RATED LAMP LUMENS PER LUMINAIRE	9,200 (d)		21,500		26,750 (e)	
1. Purchasers Net Price (less lamps) (a)	$30.00		$6.50		$21.00	
2. Installation Cost (a) (b)	12.50		10.00		15.00	
3. Initial Lamp Cost—Net (30% Disc.)	2.80		2.45		8.60	
4. Initial Cost per Luminaire	$45.30		$18.95		$44.60	
5. Watts per Luminaire	191		1000		940	
Annual Energy Cost @ 1c KWH	1 Shift	2 Shift	1 Shift	2 Shift	1 Shift	2 Shift
6. Energy Cost—1 Shift 2500 Hours per year	$4.80		$25.00		$23.50	
7. Energy Cost—2 Shift 4000 Hours per year	....	$7.60	....	$40.00	....	$37.60
Annual Lamp Cost						
8. Lamp Life in Hours	2500	4000	1000	1000	4000/1000	6000/1000
9. Number of Lamps Replaced per Year	4	4	2.5	4.0	.63/1.25	.63/2.0
10. Annual Cost of Lamps	$2.80	$2.80	$6.15	$9.80	$7.70	$9.50
11. Labor for Replacement of Lamps	.80 (c)	.80 (c)	.60	1.00	.40	.60
12. Total Annual Lamp Cost	$3.60	$3.60	$6.75	$10.80	$8.10	$10.10
13. Cost of Cleaning—Twice a Year	$1.20	$1.20	$0.30	$0.30	$0.55	$0.55
14. Annual Cost of Operating Luminaire (Energy—Lamps—Cleaning)	$9.60	$12.40	$32.05	$51.10	$32.15	$48.25
15. Annual Owning Cost (16-2/3% of Item 1 and 2)	$7.10	$7.10	$2.80	$2.80	$6.00	$6.00
16. TOTAL ANNUAL COST PER LUMINAIRE (Items 14 plus 15)	$16.70	$19.50	$34.85	$53.90	$38.15	$54.25
Illumination Design Data	1 Shift	2 Shift	1 Shift	2 Shift	1 Shift	2 Shift
17. Coefficient of Utilization ("A"—50%—30%)	.69	.69	.65	.65	.65	.65
18. Maintenance Factor (f)	.65	.60	.65	.65	.70	.65
19. RELATIVE NUMBER OF LUMINAIRES (g)—EQUAL F/C	100	108	46	46	34	37
20. TOTAL ANNUAL COST COMPLETE SYSTEM	$1670 100%	$2110 100%	$1600 96%	$2480 118%	$1300 78%	$2010 95%
21. INITIAL COST OF COMPLETE SYSTEM	$4530	$4890	$860	$860	$1520	$1650
22. KW—Complete System	19.1	20.6	46	46	32.0	34.8
23. Annual Energy Cost @ 1c KWH	$480	$820	$1150	$1840	$800	$1990
24. Number of Lamps Replaced per Year	400	432	115	184	21/43	23/74
25. Annual Lamp Cost	$360	$390	$310	$500	$280	$370
26 Annual Cleaning Cost	$120	$130	$20	$20	$20	$20
27. Annual Cost of Operating Complete System (Energy—Lamps—Cleaning)	$960	$1340	$1480	$2360	$1100	$1780

DEFINITIONS FOR COST DATA

A lumen is a unit of lighting or luminous flux. The term is used in the cost tables as a unit of measure analogous to gallons per minute.

A luminaire, as the term is used in the cost tables, is the unit of lamps and equipment basic to the systems for which comparison data are presented.

FOOTNOTES:

(a) Estimated.

(b) Includes cost of installing and wiring to branch circuit.

(c) Replacement cost per lamp for Fluorescent is estimated to include the added expense of service of starters which are a part of the system.

(d) Lumen values for fluorescent system based on white lamps (3500° K).

(f) Maintenance factor includes loss of light to 70% rated lamp life reduced by a further 20% for dirt collection.

(g) Number of luminaires to produce equal illumination based on a system of 100 8′ long sections of continuous channel for two industrial type reflectors, each reflector for 2 40-watt fluorescent lamps. For example, this would provide 50 footcandles maintained in service for an area of approximately 8000 square feet. For other room conditions the number of luminaires is inversely proportional to the coefficient of utilization.

(e) Lumens per luminaire in this case represents one-half of total lumen output of two outlets, one 1000-watt incandescent lamp on one and two 400-watt Mercury lamps on the other.

21,500 1000-watt incandescent
32,000 2 400-watt mercury

53,500 Total
÷ 2 = 26,750 lumens per outlet

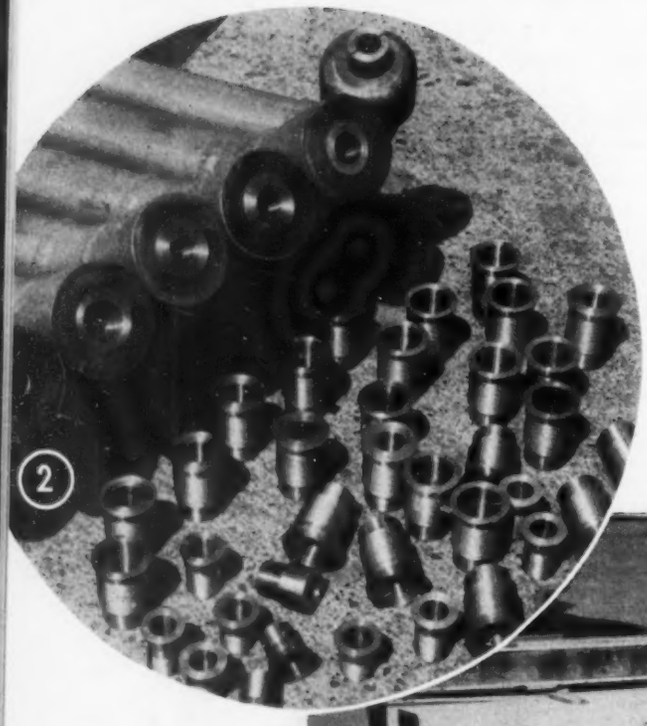
Costs, number of lamp replacements and wattage are computed on this same basis.

OFFICIALS of the Linde Air Products Co., unit of the Union Carbide & Carbon Corp., New York, recently invited editors of STEEL and other business publications to hear a progress report on use of oxygen in steelmaking and to visit its experimental facilities at Tonawanda, N. Y. and its modern liquid oxygen plant at East Chicago, Ind.

Hosts included T. D. Cartledge and L. A. Bliss, senior vice presidents; P. B. Pew, J. J. Murphy and E. J. Hayden, vice presidents; Dr. J. F. Eversole, superintendent, Tonawanda Laboratory; Dr. L. I. Dana, research manager; Dr. J. M. Gaines, assistant superintendent; G. M. Skinner, head, Metallurgical Division, Tonawanda Laboratory and J. H. Zimmerman, head of the Newark Laboratory.

Among the various facts which came out of the resume were these: There is not a sufficient supply of oxygen in the United States to serve the steelmaking industry at present nor will there be for at least 2 years; experiments at 24 steel plants indicate a speedup in the time of heats and with greater economy, and that additional handling equipment will have to be installed to get raw materials on the charging floor at a faster rate than is now possible.

Results which have come out of the experimental work at various open hearth and electric furnace shops using oxygen for the meltdown of scrap and for working the heats are presented in the accompanying article.



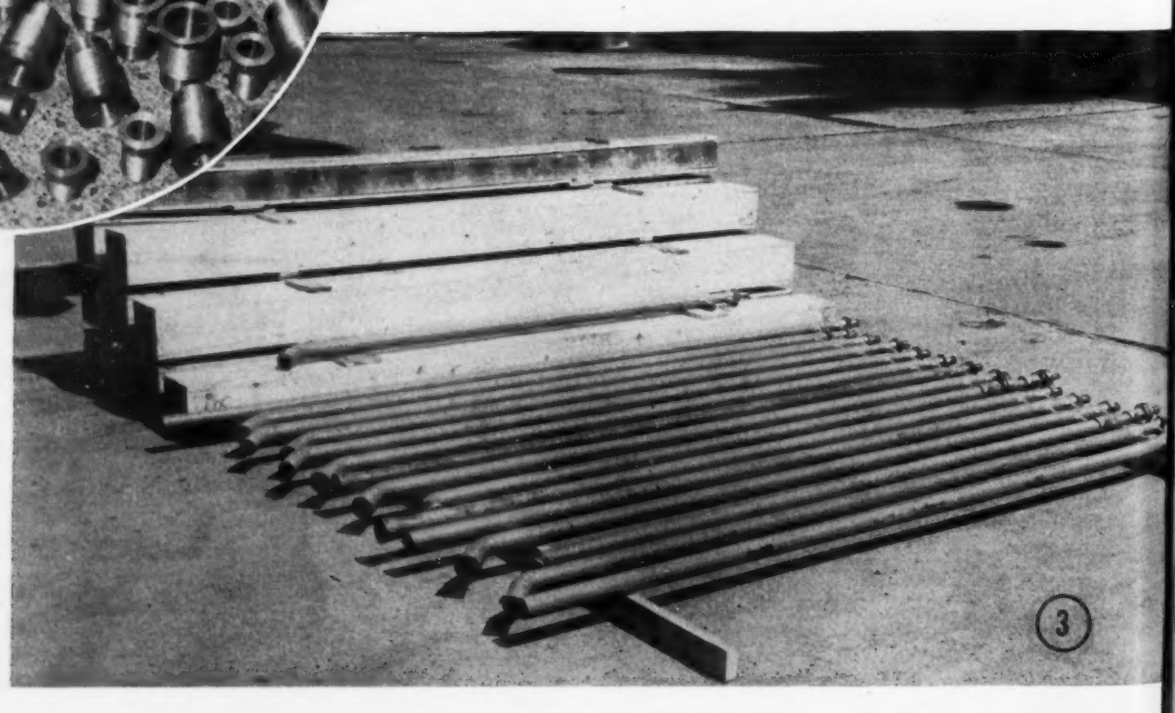


Fig. 1—Type of flame produced with oxygen

Fig. 2—Divergent nozzles for jet device

Fig. 3—Various types of jet devices designed for oxygen flow from 3000 to 70,000 cfh.

Fig. 4—Section of open-hearth furnace showing zones of charge affected by jet device when used for pure oxygen meltdown

By JOHN D. KNOX
Steel Plant Editor, STEEL

What About the Use of Oxygen in Steelmaking?

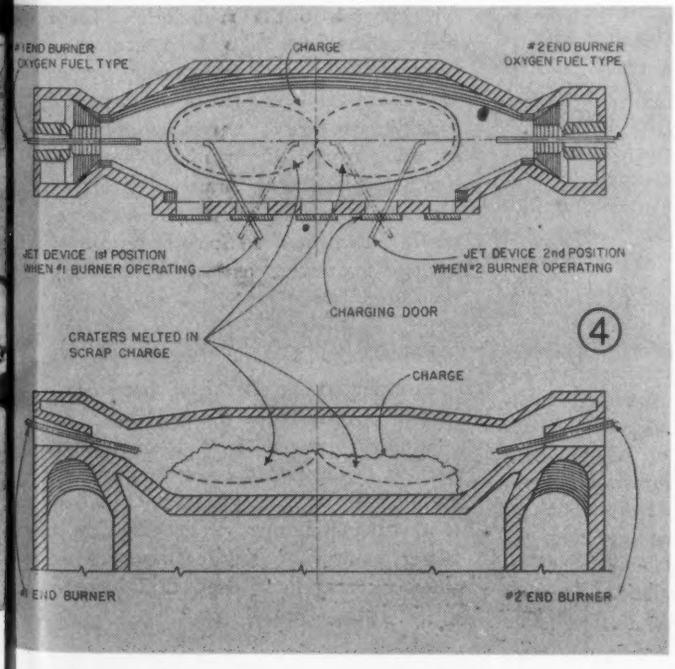
Four methods employed for decreasing the melting period. Oxygen burner practice reduces charge-to-tap time from 10 to 25 per cent and yields better control of slag temperature. Auxiliary burners promise reductions in charge melting time. Evaluation of results are explained

MOST of the work thus far performed in open-hearth and electric furnaces has been with oxygen of 99.5 per cent purity. Oxygen of this purity is the standard product, and therefore has been much more readily available than oxygen of lower purity, or even compressed air. It has been difficult, therefore, in the short time that these experiments in the steel industry have been under way, to determine the performance of oxygen of lower purity. However, some tests were run early in the program and such work is now going forward on a larger scale. Before long, it is anticipated that some of the important effects of varying the purity of oxygen in open-hearth practice will be determined.

Factors of purity as well as volume will have important effects on the trend which the future use of oxygen for metallurgical purposes will take. It may well develop that compressed air will be used in certain phases of open-hearth practice.

Shortening of the meltdown period has been accomplished by four different methods:

1. Enrichment of air by passing oxygen through the end burners or through auxiliary equipment located immediately adjacent to the end burners.
2. Scrap melting by directing oxygen onto preheated scrap.
3. Use of oxygen in auxiliary burners to supply a fuel-oxygen flame to accelerate meltdown.


#1 END BURNER OXYGEN FUEL TYPE
CHARGE
#2 END BURNER OXYGEN FUEL TYPE
JET DEVICE 1st POSITION WHEN #1 BURNER OPERATING
JET DEVICE 2nd POSITION WHEN #2 BURNER OPERATING
CHARGING DOOR
CRATERS MELTED IN SCRAP CHARGE
4
CHARGE
#1 END BURNER
#2 END BURNER

4. Enrichment of air by injecting oxygen into the intake to the checkers.

The Merit Factor: It is well known that the cost of producing a heat varies greatly from shop to shop, depending upon their practices and their accounting procedures. However, it was necessary to have some device for evaluating the results obtained from the use of oxygen at any one furnace, as compared with another furnace. Therefore, a simple method for expressing this relationship was evolved, called the merit factor, defined as:

$$\frac{\%\ \text{Reduction Charge-to-Tap Time} \times 100}{\text{Cu Ft of Oxygen Per Ton Ingots}}$$

The merit factor gives a truer picture of oxygen use than an expression of the percentage reduction in charge-to-tap time alone, because it takes into account the quantity of oxygen used. However, the merit factor should be employed only as a guide, as other variables of steelmaking practice may materially effect the relative efficiencies indicated.

Meltdown Period: Selection of the most suitable method of using oxygen is dependent chiefly on the percentage of cold charge, facilities for charging, type of steel produced, and furnace conditions. Increased productivity per furnace will result if scrap handling capacities, tapping and teeming facilities, and rolling mill capacity will permit expansion of the production rate for a bank of open hearths. If conditions do not permit this expansion, use of oxygen may be advantageous by producing the same amount of steel from a lesser number of furnaces, particularly if those furnaces which normally operate at lower efficiency are shut down.

Scrap meltdown by directing oxygen onto preheated scrap and oxygen enrichment through burners can be advantageous when scrap percentages are relatively high, and efficient charging is practiced. Should time of charging scrap be excessive, no advantage in faster meltdown times accrues from the use of oxygen. In general, the scrap charge must be 35 per cent or more before use of oxygen is indicated, although this percentage might be somewhat lower in shops using relatively old furnaces.

Oxygen through main burners is the method utilized for the largest number of experiments conducted on the use of oxygen in the open hearth. The objective has been to improve the heating flame characteristics, accomplished by supplying oxygen through the main burners of the furnace (the end burners) to obtain localized higher flame temperatures. The function of the main burner is the

TABLE I—RESULTS OF PURE OXYGEN ON PREHEATED SCRAP MELTDOWN TESTS

Plant	I	J	J_2
Size of heat tapped, tons	3.62	180	180
No. heats averaged	11	1	1
Average charge			
Scrap, %	60	60	60
Molten pig, %	..	40	40
Cold pig, %	40		
Ore, %	..		
Fuel	Nat. Gas	Oil	Oil
Fuel rate during meltdown, cfh.	2,600	400	400
Average O_2 flow, cfh	11,690	30,000	30,000
Duration of flow, min	14	13	8
Total O_2 used, cf/heat	2,730	6,500	4,000
Total O_2 used, cf/ton steel	755	36	22
Charge-to-tap heat time, with O_2	4.4	9	10
Charge-to-tap heat time, without O_2	6.2	12	12
Per cent decrease with O_2	29.1	25	17
Merit factor	3.9	70	75
O_2 velocity, ft/sec	1180	1360	1360
Yield, % of metallic charge without O_2	86.5	90	90
Yield, % of metallic charge without O_2	89.0	90	90
Length of preheat time, hr	1.3	0.5	0.5
Tons/hr charge-to-tap with O_2	0.82	20	18
Tons/hr charge-to-tap without O_2	0.60	15	15
Per cent increase in production	36.7	33.3	20.0
Oxygen equipment used	Special Burner	Jet	Jet

supplying of heat to:

1. Melt the scrap.
2. Cause the furnace refractories to attain and hold the desired temperature during the various stages of the heat.
3. Maintain bath temperatures during refining.

For these purposes about 3,500,000 to 4,500,000 Btu of heat are required per ton of steel. In shops using a 100 per cent cold charge, the heat input rises to as much as 5,500,000 Btu per ton, or more. Approximately 20 to 25 per cent of this heat enters the steel and the rest is lost to the furnace, waste heat boilers, and stack. The customary fuel requirements per heat for a ton of steel are approximately 20 to 30 gal, based on a heat of combustion of liquid fuels of 150,000 Btu per gal. Complete combustion of 20 to 30 gal of Bunker C oil, heavy fuel oil, or tar requires 6500 to 10,000 cu ft of oxygen, which may be supplied entirely from air, or some of the oxygen may be supplied entirely from air, or some of the oxygen may be supplied through the end burners. When oxygen is used in the main burners, the quantity thus supplied consitutes approximately 20 to 30 per cent of the total requirements of the furnace.

While a considerable variety of end burners have been used to introduce oxygen into open-hearth furnaces, the majority of burners fall into two types:

1. Burners containing an annular passage to supply relatively low velocity oxygen in a sheath around the fuel.
2. Burners containing a single passage to supply a high velocity oxygen stream below the fuel. (shown in Fig. 2)

Burners, when operating with oxygen, must produce a flame of sufficient length and with characteristics suitable for transmission of maximum heat to the charge without overheating furnace refractories. This same burner must also produce a satisfactory flame when operating in a normal manner without oxygen.

Oxygen enrichment can be provided for existing burners by furnishing a water-cooled, auxiliary installation containing a high-pressure oxygen nozzle to supply a high-velocity oxygen stream below the fuel stream. The head of the auxiliary equipment has a replaceable nozzle designed to furnish supersonic oxygen velocities.

The maximum quantity of useful fuel and hence the total available heat liberated inside the open hearth therefore can be increased considerably by use of oxygen. Recent measurements in several mills show that use of oxygen through end burners increases radiation from the flame by about 10 per cent throughout the major volume of the flame, rising to over 20 per cent at the charging door nearest to the burner, and dropping to 5 per cent at the charging door at the opposite end of the furnace. Furthermore, measurements of furnace atmosphere in a 135-ton open hearth indicate that oxygen concentrations as high as 7 per cent exist just below the flame at distances of 10 ft from the burners, and 15 per cent 8 ft from the burners. Introduction of oxygen through the main burner did not, however, affect the composition of the exhaust gases to a noticeable degree because air input to the checkers is usually reduced during the oxygen flow period to provide about the normal 1 to 2 percent oxygen in the downtakes.

A reduction in heat time with attendant increase in production is a result of accelerated rate of charge meltdown, produced by introduction of oxygen through end burners. Careful analysis of this large number of open-hearth heat records shows that a 10 to 25 per cent reduction in charge-to-tap time can generally be effected in open hearths where conditions indicate the use of oxygen in end burners. The oxygen consumption required for this purpose varies from somewhat less than 400 to about 750 cu ft of oxygen per ton of steel per heat. Corresponding merit factors range from 2 to 6.

Scrap must be supplied to the furnace at a rate at all times equal to the melting rate if oxygen is to be used to full advantage. As a generality, few shops that are melting with oxygen have provided adequately for this factor. Several heats made under conditions where the furnace on oxygen was favored with respect to scrap illustrate what may be utimately accomplished. As an example, production from a 125-ton open hearth was increased 32 per cent with 337 cu ft of oxygen per ton. A merit factor of 7.2 was obtained.

Rapid melting obtained with oxygen supplied to end burners produces less oxidation of the scrap than does normal practice. This causes heats to melt higher in carbon and requires some adjustment in ratios of hot metal, scrap, and ore to restore normal meltdown conditions.

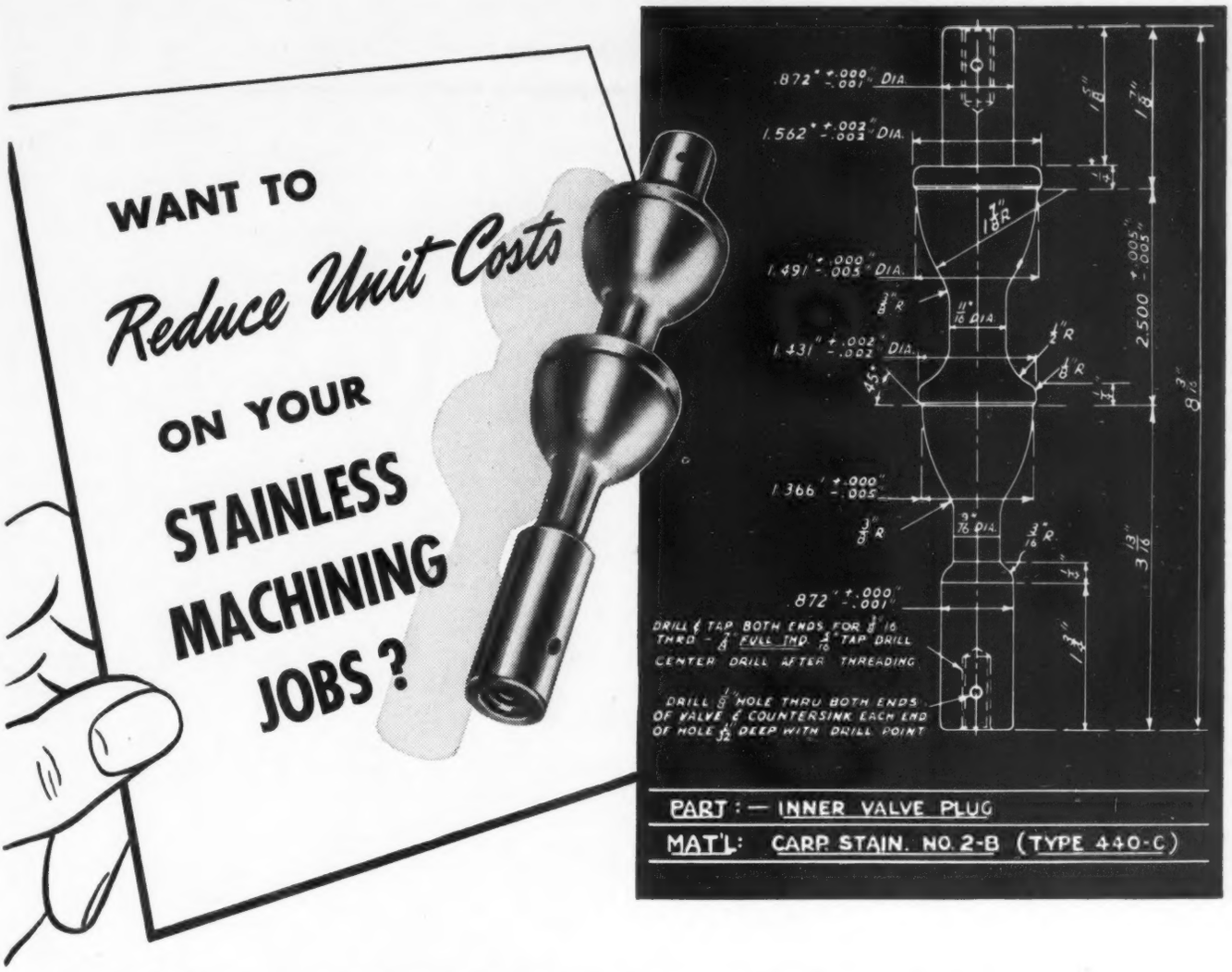
Reduction of absorption of sulphur from the fuel is to be expected because of the shorter time of exposure of the scrap to the flames. Data are lacking to establish this quantitatively, although it has been stated that oxygen-melting introduces no difficulties with respect to elimination of sulphur or phosphorus. Recent comments by steel operators indicate lower sulphur content in heats melted with oxygen through the burners.

Enrichment of air with oxyen supplied through end burners has not caused a noticeable change in refractory life on furnace sidewalls, backwalls, or roof, when care is taken to direct the flame properly and to confine as much radiation to the bath as possible. During a series of campaigns in an eastern mill, introduction of oxygen through main burners, resulted in no unusual conditions with regard to the refractories. These observations have also been confirmed during shorter periods of main burner oxygen usage in a number of shops.

Additional benefits have been obtained by using oxygen through main burners. For example, the performance of a furnace at the end of its campaign was recently "sharpened" sufficiently by use of oxygen to permit continued operation for 30 additional heats. During a portion of its extended life this furnace led the shop in production.

Foaming, rising slags have been combatted effectively in several mills by continuing oxygen flow through end burners to increase the slag temperature and thereby reduce viscosity. In addition, oxygen burner practice yields a better control of slag temperature in shops utilizing flush slags, thus increas-

(*Please turn to Page* 144)


WANT TO
Reduce Unit Costs
ON YOUR
STAINLESS
MACHINING
JOBS?
.872" +.000 -.001" DIA.
1.562" +.002 -.002" DIA.
1.491" +.000 -.005" DIA.
1.431" +.002 -.002" DIA.
1.366" +.000 -.005
.872" +.000 -.001"
2.500 +.005 -.005
DRILL & TAP BOTH ENDS FOR 3/16 THRD - 3/8" FULL IMP 5/16" TAP DRILL
CENTER DRILL AFTER THREADING
DRILL 3/8" HOLE THRU BOTH ENDS OF VALVE & COUNTERSINK EACH END OF HOLE 1/32 DEEP WITH DRILL POINT
PART :— INNER VALVE PLUG
MAT'L: CARP STAIN. NO. 2-B (TYPE 440-C)

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Engineering News *at a Glance*

SPEED AND CO-ORDINATION: Each motor in Weirton Steel's mile-a-minute steel rolling mill, placed in operation recently, was individually designed by Westinghouse engineers to co-ordinate the five sequences of speed necessary for overall operation of the mill. The 4500 hp unit that delivers the finished product from the last stand is reported the largest ever used on such a project. Steel feeding into the mill passes through the first of five sets of rolls at approximately 650 fpm. It is speeded on its way to the next stand at an 1100-fpm stage, then 2100, 3200 and finally to 5000 fpm. Tensiometers between each of the five stands indicate tautness of the strip metal.

DETECTS MINUTE STRAINS: Changes in length of a specimen as small as 8 millionths of an inch per inch can be recorded, even though the changes occur at the rate of 200 per second by a new strain indicator developed at the Navy's David W. Taylor model basin, Washington. According to the Office of Technical Services, turret structures and gun foundations have been tested during elevating operations. Strains also have been detected in model landing craft during beaching operations. Other determinations include measurement of the towing capacity of marine tugs, recoil acceleration in naval gun mechanisms, blast pressure in connection with launching aerial rockets, and measurements of the steady and oscillating torque in drive shafts.

WING ANTENNA: Wing itself acts as an antenna in the new system of external aerial wiring for airplanes developed recently by the Army Air Forces at Wright Field. The development is said to help eliminate radio static under bad weather conditions. Its use involves the installation of exciter coils between the inboard engines and fuselage to energize the entire wing structure.

METHOD OF SAVING GAS: Proper selection of furnace refractories is an important factor in stretching the available supply of gas for industrial use, it was pointed out recently by J. D. McCullough, head of the engineering and service department, Babcock & Wilcox Co., New York, at the school of industrial gas engineers, conducted by the American Gas Association in Columbus, O. Both heat storage and heat flow losses can be reduced greatly by using lightweight refractories, he stated. One of the examples cited concerned a heat treating furnace operating one shift per day at a temperature of 2000° F. When lined with 9 in. of firebrick weighing 8 lb each, the heat loss each day through storage and because of conduction through the wall amounted to 27,000 Btu psi. When lined with insulating firebrick weighing only 1½-lb each, the heat loss was only 4100 Btu psi—a saving of about 85 per cent.

RUBBER-COVERED SCREEN: In Detroit, Automotive Rubber Co. Inc., it is learned, is making available for materials handling purposes woven wire screen and expanded or perforated metal in all mesh and sizes. According to the company, purpose of the screens is primarily to protect by rubber cushion, parts that are plated, painted or precision finished so they will not be marred. They also are used successfully as separators in palletizing and stacking parts, materially reducing tipping and skidding of the tiers.

SAVES FUEL: Fuel savings of 7 to 15 per cent, depending on the speed of the locomotive are provided by a new device for railroad engines known as an undergrate air distributor described by its inventor before a meeting of the motive power committee of Bituminous Coal Research Inc. in Columbus, O., recently. It provides uniform air flow to the locomotive fuel bed, preventing channels of high velocity gas that entrain cinders and unburned coal. The development is composed of parallel airflow baffles or vanes which are attached to the firebox where the air enters the ashpan. Because of a reduction in clinkers, the engine operates with more freedom from trouble, meaning increased availability, and the fireman's labors are reduced greatly.

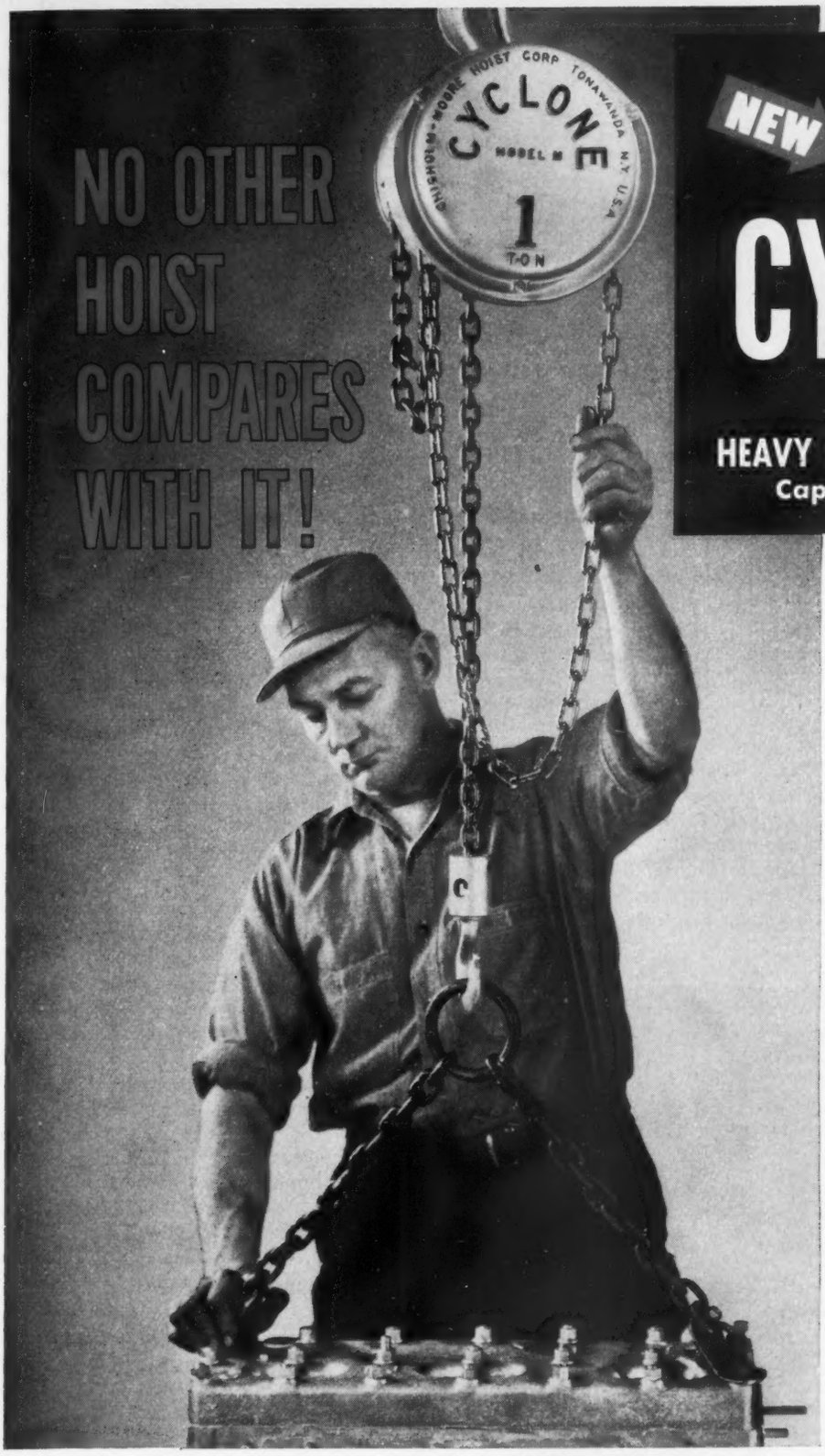
SEEKS INVENTORS' AID: In Washington, the Department of Commerce revealed that the National Inventors Council, in co-operation with the Army, Navy and Coast Guard, is making available a list of technical problems for consideration by American inventors. Solution of these problems, it is said will greatly facilitate the work of the armed forces and improve national defense.

STEEL'S THIRST: Catering to the insatiable thirst of a steel mill is not a simple job. On an average day the industry's plants use roughly 4,600,000,000 gal of water in washing down the feast of vast quantities of iron ore, coal, limestone and scrap. According to *Steelways*, issued by the American Iron and Steel Institute, one large plant, by itself, requires 500,000,000 gal of water on a hot summer day; another of the nation's steel mills consumes 350,000,000 gal every 24 hours. In effect, the industry uses as much water each day as would be needed for 1000 cities of 40,000 population. Almost all of the water used is pumped by the plants themselves. Electric and steam pumps bring most of the water to a pressure of about 42 psi for plant use. So-called "hydraulic" water, however, is pumped to pressures as great as 750 lb, and is used to remove scale, for opening furnace doors and to operate other mechanisms.

STAINLESS ALL AROUND: Stainless clad steel supplied by Jessop Steel Co., Washington, Pa., is incorporated in the experimental refrigerator car recently placed in service by the Santa Fe for hauling perishables from California to Chicago. The car, built by Consolidated Steel Corp., Los Angeles, is designed with stainless steel side sheathing and stainless clad steel ends—the latter being specified in order to employ a heavy, rugged material which would withstand denting and other mechanical abuse. The cladding also improves the appearance of the car.

MEASURES OIL FILM: Thickness of oil film in the bearings of a large Navy turbine shaft was measured recently by a device developed by M. L. Greenough of the National Bureau of Standards, Washington. Equally capable of measuring paint and varnish films, the electronic instrument makes use of the magnetic field distribution about a coil excited by high frequency currents in the presence of a metallic plate principle, in its operation. At the surface of the plate the field is zero and increases to a maximum at the coil. Voltage induced in a pickup coil indicates the separation of the small cylinder containing the coils from the plate. Voltage is registered on the dial of the meter which is calibrated in thousandths of an inch.

RETREADS INDUSTRIAL APRONS: By applying the "retread" idea to industrial aprons, A. T. Francis, owner of Columbus Glove Mfg. Co., discovered an effective method of reducing the annual apron budget of many manufacturers. Most aprons, according to the manufacturer, wear or break through in one or two places. Thus it is only necessary to patch the badly worn spot, then retreat the entire fabric with a Neoprene solution such as the company uses in making new aprons. From a practical standpoint, a "retread" may last longer than the original garment because the used one is patched and doubly reinforced at the worn or damaged spot.



NEW **CM**

CYCLONE

Model M

HEAVY DUTY HIGH SPEED HOIST

Capacities from ¼ ton up

- **96% EFFICIENCY** — conserves worker energy and increases productivity
- **42% FEWER PARTS** — simplifies maintenance
- **63% LESS WEIGHT** — yet definitely a heavy duty hoist
- **Plus SEALED-IN LIFETIME LUBRICATION** — simplifies servicing... prolongs life... maintains efficiency
- **Plus HERC-ALLOY CHAIN** — America's First and Safest Steel Load Chain

The Cyclone Model M Heavy Duty Hoist is entirely new, completely different. Size and weight have been greatly reduced, and strength and durability greatly increased through the use of today's stronger alloys of steel and Alcoa aluminum. Efficiency and ease of operation have been increased to new high levels through the use of precision ball bearings at all rotating points. The many advantages of this unusual hoist are being demonstrated daily on-the-job by thousands of Cyclone Model M's already in service. *Ask your distributor* to show it to you.

● **New type load brake gives smooth, positive control at all times... exceptionally valuable in spotting or assembly work. Famous CM "Herc-Alloy" double duty alloy steel load chain is standard equipment on all models. The 1-ton model weighs only 35 pounds, has a minimum headroom of only 13⅜".**

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(Affiliated with Columbus-McKinnon Chain Corporation)

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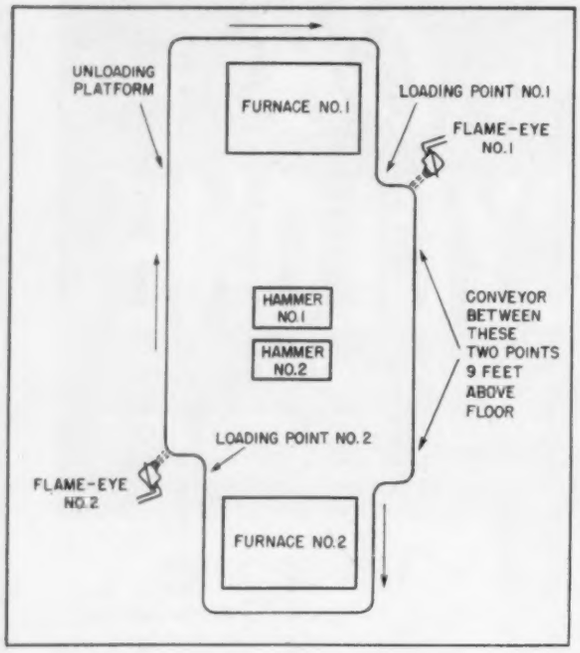


Fig. 1—Diagrammatic arrangement of furnaces, continuous conveyor, photoelectric cells, loading and unloading points

FORGING PRODUCTION READINGS

Provided by Combustion Safeguard

AN application of a photoelectric eye circuit and equipment, ordinarily used to prevent explosions in combustion equipment such as boilers and ovens, to the problem of keeping accurate running account of forging production was made recently in a large shop located in New England.

Here, the production line includes two large forging furnaces with a single continuous conveyor encircling the furnace, carrying the crank shafts to an unloading point.

After forging, the operator hangs the crank shafts in a vertical position on the continuous conveyor. As these shafts travel along, still at very high temperature, they pass directly in the path of the Flame-eye photoelectric unit, which is used with a Flame-otrol unit, both made by Wheelco Instruments Co., Chicago. The radiant heat from the hot forging causes the cell unit to close a circuit and energize a step-up circuit that is connected with an electric integrator. The integrator in turn provides continuous production readings.

Two such counting units are used, the production from each furnace being totaled separately. From the two readings, the overall production is easily determined. The furnaces are placed some distance apart so that by the time the shafts from the first furnace travel past the second furnace, they have cooled sufficiently that they have no effect on the second photoelectric cell. The shafts are spaced by the operator of the first furnace so that shafts of the second furnace are hung in between thus as they reach the second photoelectric cell, only the shafts at high heat (every other one) make contact with the cell.

Used in conjuction with a Flame-otrol as combustion safeguard on oil-fired equipment, the Flame-eye is essentially a photoelectric cell with light filter, acting as a sensing unit. The filter, placed between the light source and the cell, intercepts all light rays except those being monitored. The unit "sees" whether or not combustion is safe, and the control immediately shuts off the fuel supply when combustion fails—permitting fuel flow only when combustion can take place safely.

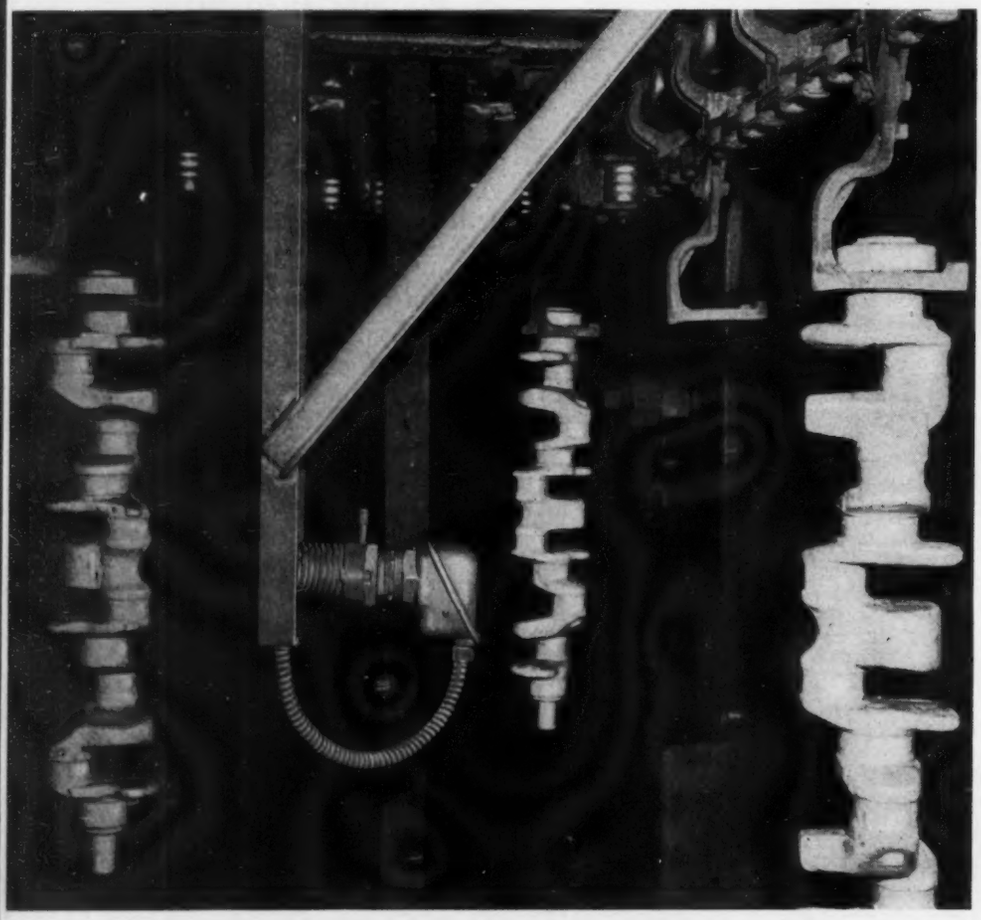
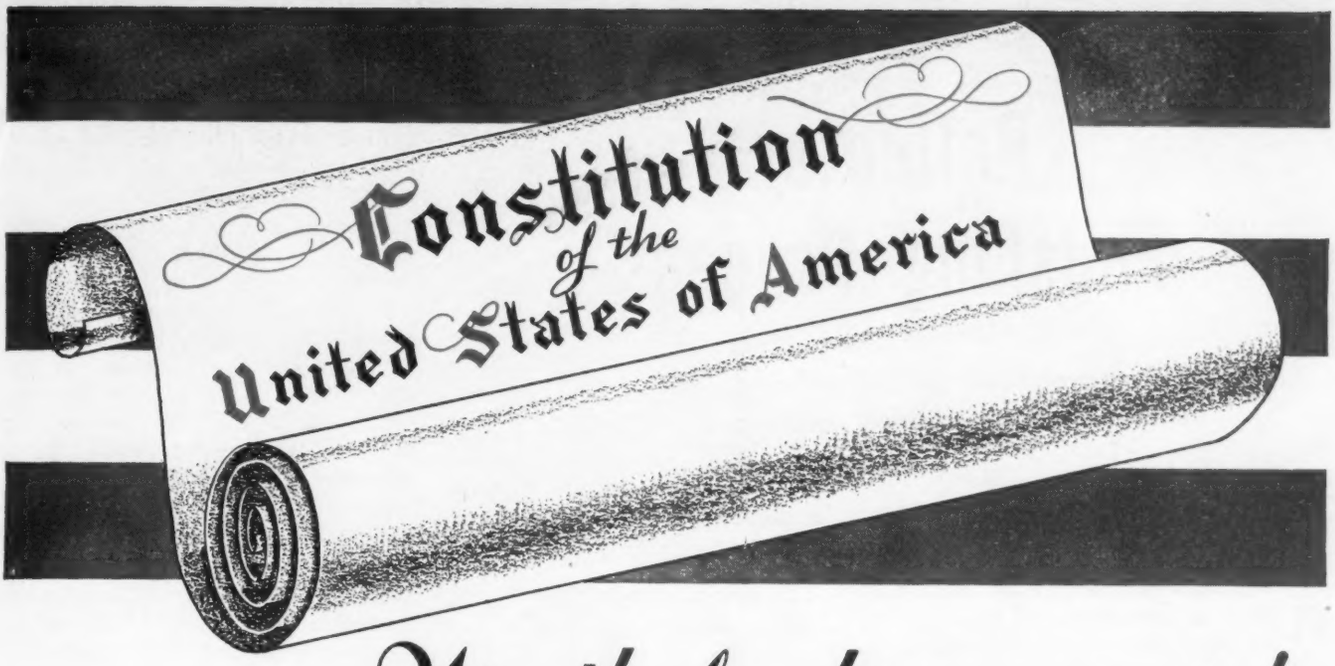
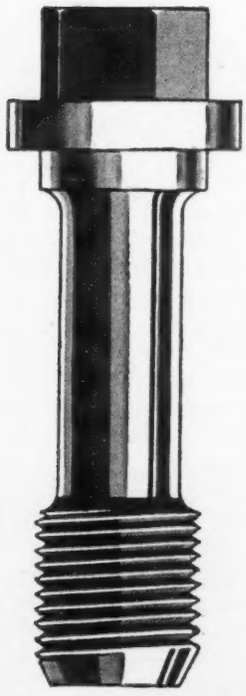


Fig. 2—Location of photoelectric cell unit in respect to the crank shaft forgings on the conveyor



Worth looking up to!

The Constitution of the United States is one of the most important works ever conceived by the mind of man. It has no equal in the documentary annals of governmental society because it recognizes and guarantees the liberty and dignity of man. A public declaration of the principles of the United States, it has guided our Republic during a period of over 150 years, through revolution, rebellion, expansion, panic and world conflict. In a world blighted by incalculable greed and darkened by fear, the United States Constitution is a bright beam of hope.



In the harsh and shouting times of war the Constitution never lacked defenders. When it trembled before determined assault the nation rallied to uphold it. Today, in the lee of an uneasy peace, the Constitution again trembles. Selfish politicians, greedy demagogues and pliant jurists tamper with it, warp its meaning, advance brazen misinterpretations, and craftily seek to undermine this supreme authority of the United States.

The CHANDLER PRODUCTS CORPORATION reaffirms its loyalty to the Constitution. Through the wisdom of our founding fathers and the grace of the Constitution we are a beneficiary of private incentive and free enterprise. And while our success is attributed to the fine quality of our products, our security is backed by the U.S. Constitution. May it forever safeguard American liberty!

CHANDLER PRODUCTS CORP.
1491 CHARDON RD. CLEVELAND 17, OHIO

Reflector Finishing Process

. . . electrolytically produces finishes unique to aluminum used for lighting purposes

By RALPH PETTIT
Development Division Engineer
Aluminum Co. of America
Pittsburgh

ALUMINUM has long been recognized as a good reflector, not only for light but also for ultraviolet and infra-red radiation. The natural efficiency of aluminum as a reflector can best be realized by means of the Alzak process, discovered in the Research Laboratories of Aluminum Co. of America.

In the case of a reflector drawn or spun from sheet, the preliminary treatment may be a mechanical buffing and polishing operation for a specular reflector or a chemical etching treatment for a reflector with a diffusing surface.

The first step in the Alzak process is an electrolytic brightening treatment, in which the aluminum is made anode in an electrolyte of fluoboric acid. By this treatment the surface film of metal is electrolytically dissolved, leaving the metal clean and bright. In the second step, the surface is anodically oxidized in another electrolyte to produce a transparent, adherent and protective coating of aluminum oxide. This anodic oxide coating is not only hard, so that the surface can be readily cleaned by wiping or washing, but it also offers substantial protection against weather.

Extent of protection afforded by the oxide coating depends in large measure on its thickness and quality. An example of the protection afforded by even a thin oxide coating is demonstrated by Alzak reflectors that were continuously exposed for 3 years on the eastern seacoast at a point about 60 ft from the waterline. Oxide coatings only 0.0001 in. thickness imparted a considerable measure of protection; thicker coatings gave, of course, proportionately superior results. The specular reflecting surfaces exhibited greater resistance to weathering than diffuse reflecting surfaces.

Excellent as the protective action of the oxide coating has proved, it is not adequate for long continued service in all environments. Experience has shown that service in some industrial locations and along some rural highways may be more severe than near the seashore. A characteristic pitting attack of the oxide coating may occur when dust and dirt stick to the reflecting surface and are not washed off freely by rain or by regular maintenance procedures. These soil particles are absorptive in nature and consequently collect and hold moisture, together with sulphur dioxide and sulphur trioxide that may be present in industrial atmospheres. The acid solution formed in this way slowly attacks the oxide coating and roughens the surface; this promotes further adhesion of foreign matter. In time, the coating may be penetrated by this action.

This pitting affects the reflector's appearance and may reduce its reflectivity. It has been noted, however, that the pits show little or no tendency to spread laterally and only a small proportion of the reflecting surface is usually affected. As a result, when the reflector surface is cleaned, very little loss in output is observed. This type of attack can be greatly reduced and even completely eliminated by a regular cleaning.

From observations made of commercial installations, the topside of horizontally hung reflectors and the surfaces of vertically placed units are quite free from pitting. From their position these surfaces are readily washed by rain and thus do not collect dirt. Furthermore, owing to their position, they do not remain wet for substantial periods of time.

When regular cleaning is impractical, or when severe corrosive influences are encountered, a plastic seal may be successfully employed on the oxide surface. One such installation, where the reflecting surfaces were protected by plastic sealing, was continuously exposed to the industrial atmosphere of New Kensington, Pa. for 2 years. Before exposure, the sealed oxide-coated surface had a reflectivity of 82 per cent. Two years later, after a simple soap and water wash, the reflectivity was still 82 per cent, and the surface had not depreciated.

Satisfactory performance of installations outdoors is best obtained by the use of a cover glass or lens over the reflector. In applications of this type, the reflector surface is protected against the accumulation of soil, although the units are not ordinarily closed against "breathing" with changes in temperature.

Alzak reflectors installed indoors are practically permanent, and can be maintained at their high efficiency by a periodic cleaning. Since there is no tarnishing of the reflecting surface under such conditions, the method of cleaning may be very simple—usually wiping with a soft rag is sufficient.

Oxide coating formed on the surface of aluminum by this process does not discolor or chip with changes of temperature produced by the lighting element. Since, however, metallic aluminum has a higher coefficient of thermal expansion than aluminum oxide, extreme increases in temperature may produce sufficient stress between the metal base and the oxide coating to cause crazing, or the formation of fine hairline cracks. Ordinarily a temperature of 300 to 400° F is necessary to cause this condition, although the exact temperature depends on the thickness of the coating and its method of production. As a rule, these hairline cracks are practically invisible and do not reduce the reflectivity.

Despite the many advantages possessed by Alzak reflector surfaces, there are occasions when their use may not be the

LIGHT OUTPUT OF ALUMINUM BASE REFLECTORS

Reflector Number	Reflector Surface Treatment	Developed Candlepower
1	Reflector as buffed	97,000
2	Alzak electrolytic brightening treatment	104,000
3	Alzak electrolytic brightening treatment with 0.00015 in. oxide coating	93,000
4	Alzak electrolytic brightening treatment with 0.0003 in. oxide coating	85,500
5	Alzak electrolytic brightening treatment with clear lacquer coating	67,500
6	Silver plate direct on aluminum	125,000
7	Buffed copper plate on aluminum followed by rhodium plate	77,500
8	Buffed nickel plate on aluminum followed by chromium plate	90,000

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¼" to 4" O.D.
9 to 22 gauge

✓SQUARE
½" to 2" 20 gauge
1" to 2¾" 14, 16, 18 gauge

✓RECTANGULAR
½" to 2" 20 gauge
1" to 2¾" 14, 16, 18 gauge

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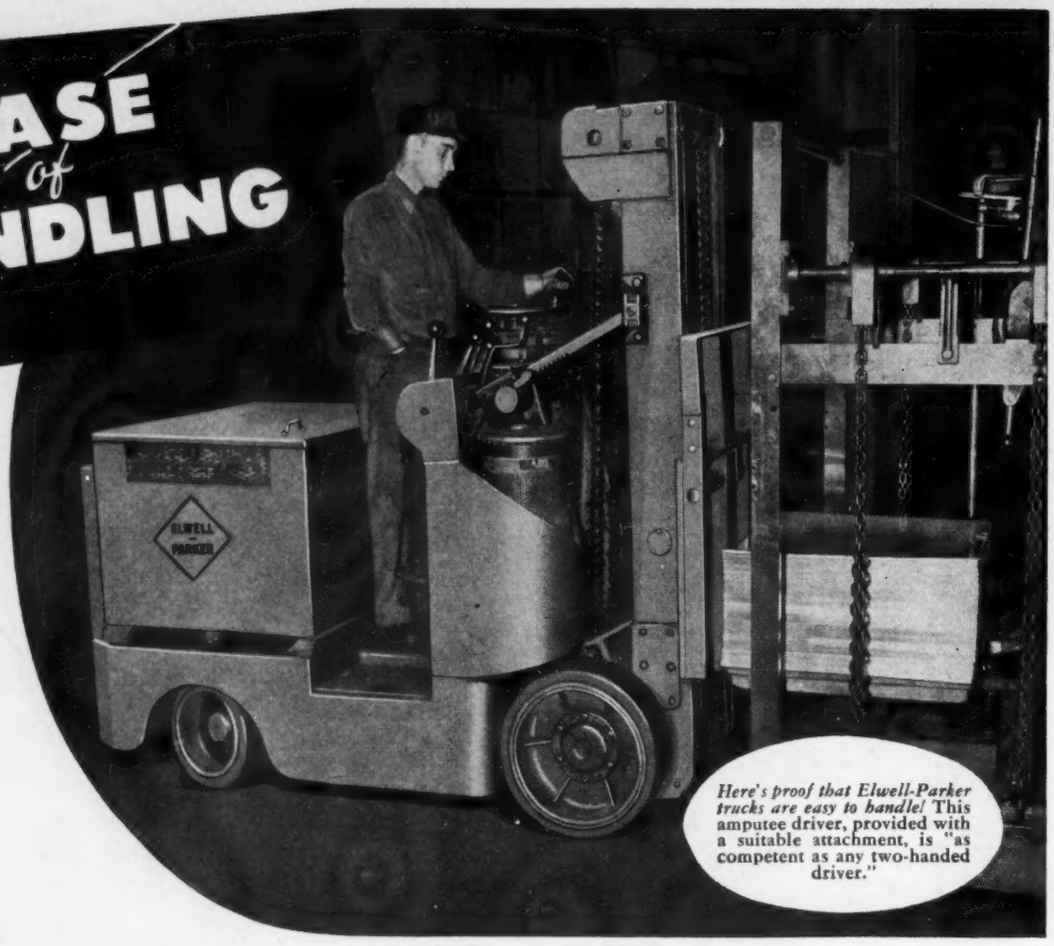
EASE of HANDLING



Here's proof that Elwell-Parker trucks are easy to handle! This amputee driver, provided with a suitable attachment, is "as competent as any two-handed driver."

one of the reasons why ELWELL-PARKERS are preferred!

Elwell-Parker's advanced design and construction make the driver *the master of the truck at all times*—he is alert, confident and capable. Here are some of the reasons:

FINGER-TIP CONTROLS—They are easily reached and insure complete and instant control of every movement—backward . . . forward . . . raising or lowering the load. Only the drive controller must be held at "on"; it turns to "off" the moment the driver releases the handle—an important safety feature. Motors for the various truck actions can be operated simultaneously.

ORIGINAL AND PROVEN BRAKING SYSTEM—The brake action is fast—soft yet positive. Brakes can be applied when power is on, so that starting or stopping on ramps is easy and safe.

COMFORTABLE, SAFE OPERATION—Cushioned pedals, easy steering, controlled speed, and smooth, quiet operation reduce fatigue, keep the driver alert and careful. Power steer furnished on larger models. On trucks with four or six wheel steer, each tire turns on a concentric circle to facilitate steering and save wear. Standing position does give the driver complete control of his heavy duty truck in the most crowded quarters. It also does enable him to dismount from either side of truck in case of emergency.

For actual demonstration of these features, plus proper application of the trucks to your specific needs, call in the nearest EP man. The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland 14, Ohio.

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Established 1893

POWER INDUSTRIAL TRUCKS

most desirable. For specific reasons some other surface material, such as silver, rhodium or chromium, may be called for. With recent developments in electroplating on aluminum, it is now possible to deposit a film of the desired metal on the surface and thus increase the range of aluminum's applications in the lighting industry. The advantages of using an electroplated aluminum reflector are several. As a base metal, the aluminum reflector is low in cost and easily fabricated by spinning or drawing. Furthermore, its light weight is desirable in many cases.

To compare characteristics of various specular surfaces, a number of parabolic reflectors were prepared, each finished in a different manner. Eight finishes were selected, and the reflectors, 6½-in. diameter, were formed from Alcoa No. 2 reflector sheet. It should be mentioned here that special reflector sheet is required only when the aluminum surface is to be given the Alzak treatment. If the reflector surface is to be natural aluminum, buffed and coated with a lacquer, or if it is to be an electroplated surface, the common alloys—2S or 3S—may be used. Or, if service conditions require it, a high-strength alloy may be used.

Employing standard optical measuring equipment, the light output and beam pattern developed by each type of prepared surface was measured, and curves plotted to illustrate its characteristics graphically.

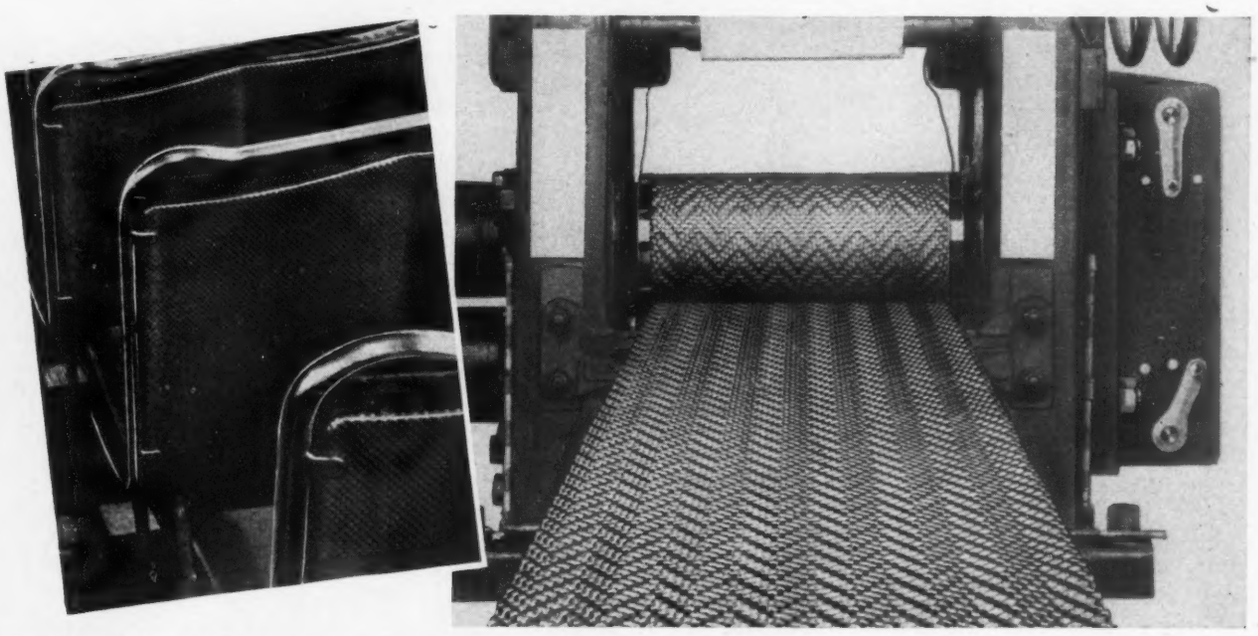
The table lists the type of finish on each reflector and the developed beam candlepower. These data show the effect of increasing thickness of oxide coating in reducing the beam candlepower. This reduction may be the result of two factors: First, some absorption of light by the oxide coating caused by traces of iron and silicon in the metal, and which remain in the oxide coating; and secondly, diffusion of light caused by these impurities and by reflection from both the oxide and from the metal surface. The results, however, are very satisfactory considering the fact that such high reflectivity is developed with a nontarnishing and readily cleanable surface.

NEMA Announces New "D" Flange Motor Mounting

Standards for a universal flange mounting of the "D" type for both horizontal and vertical end-shield mounted motors have been developed by the Motor and Generator Section of the National Electrical Manufacturers Association, New York. Previous experience with earlier adopted mountings indicated that a single mounting might be developed for both horizontal and vertical mounted motors, the change being particularly acceptable to the machine tool industry through change from the female rabbet fit of the "B" flange standard.

With this in mind a joint committee of NEMA and National Machine Tool Builders Association representatives gathered to consider the standardization of motors applied to machine tools. Result of their labor was the "D" type flange and establishment of flange dimensions for motors built in frames 203 to 505, covering ratings from 1 to 125 hp at 1750 rpm. Five "D" flanges accommodate the spread of 16 different NEMA standardized motor frame sizes.

Features of the new flange are: A male rabbet; face in line with the shaft shoulder; diameter of flange not greater than diameter of motor, except on frames 203 and 204; and the motor mounts on the machine from the motor side. With this mounting, the only machining necessary on the machine tool or other machine frame is the area on which the motor fits—an area equal to the diameter of the rabbet. Exact location of gears, pulleys or couplings can be predetermined regardless of what make motor will be installed, no extra machining being necessary to accommodate the larger shaft diameter above the shoulder.

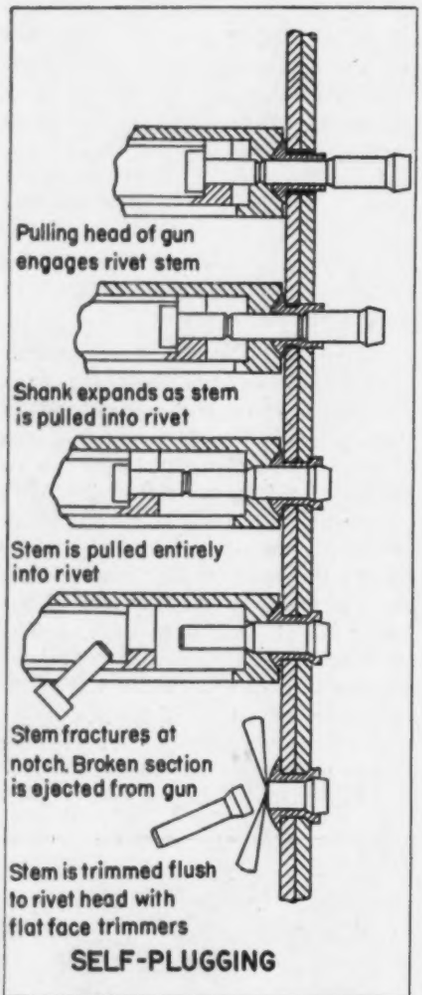


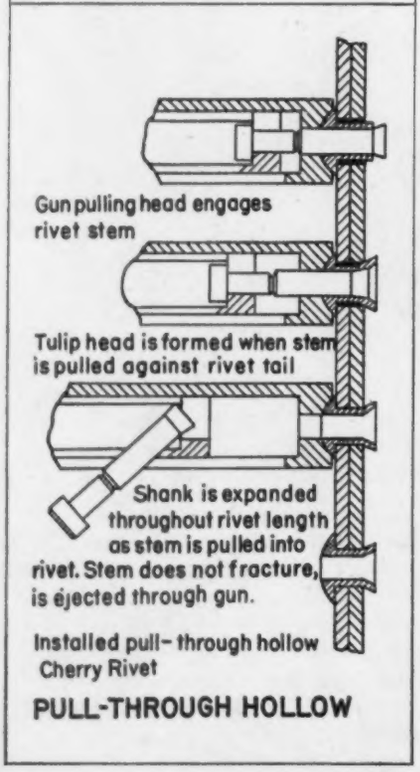
RIGIDIZED STAINLESS: Trolley seat backs, left above, are made of rigidized stainless steel produced by a patented rolling process developed by Rigid-Tex Corp., Buffalo. As a result of cold working, stainless or other steels processed in this manner are said to develop considerably higher mechanical properties per pound of weight. The design-strengthened strip is formed by cold rolling, as shown at right, which scientifically distributes the metal throughout the cross-section away from the neutral axis of the original sheet. The rigidity-weight ratio is said to be increased by the pattern developed as is also the resistance to buckling and to deformation under impact loading.

At the present time the company is rolling 18 patterns ranging in depth from 0.005-in. to 0.32-in., and in widths from 3 to 36 in. in coils or cut lengths. Special patterns are engineered for specific applications. Photos courtesy International Nickel Co.

NEW UPSETTING TECHNIQUE

. . . distinguishes latest development in blind riveting


Pulling head of gun engages rivet stem
Shank expands as stem is pulled into rivet
Stem is pulled entirely into rivet
Stem fractures at notch. Broken section is ejected from gun
Stem is trimmed flush to rivet head with flat face trimmers
SELF-PLUGGING


Gun pulling head engages rivet stem
Tulip head is formed when stem is pulled against rivet tail
Shank is expanded throughout rivet length as stem is pulled into rivet. Stem does not fracture, is ejected through gun.
Installed pull-through hollow Cherry Rivet
PULL-THROUGH HOLLOW

INACCESSIBILITY and space restrictions were two "bugaboos" which once plagued designers and manufacturers using riveting. As a result, when blind riveting was first introduced, its possibilities in simplified design and time and labor savings were quickly seen.

Following the introduction of both hollow and self-plugging types of blind rivets, a development utilizing a new upsetting technique promises further economies. Made of Monel metal, the new corrosion-resistant rivet is an assembly of two parts—a special hollow body with a hole drilled through it, and a stem, assembled in the hole. The rivet is upset in the work by pulling the stem through the rivet with a pneumatic or manual gun. When the stem is pulled, it forces the shank of the rivet to expand and completely fill the hole in the work.

This controlled expansion allows for generous hole size tolerances, and eliminates the necessity for time-consuming size-drilling and reaming before rivets can be inserted in the material. The result is a tight, permanent joint, highly resistant to stress changes and to the cumulative fatigue effects of vibration.

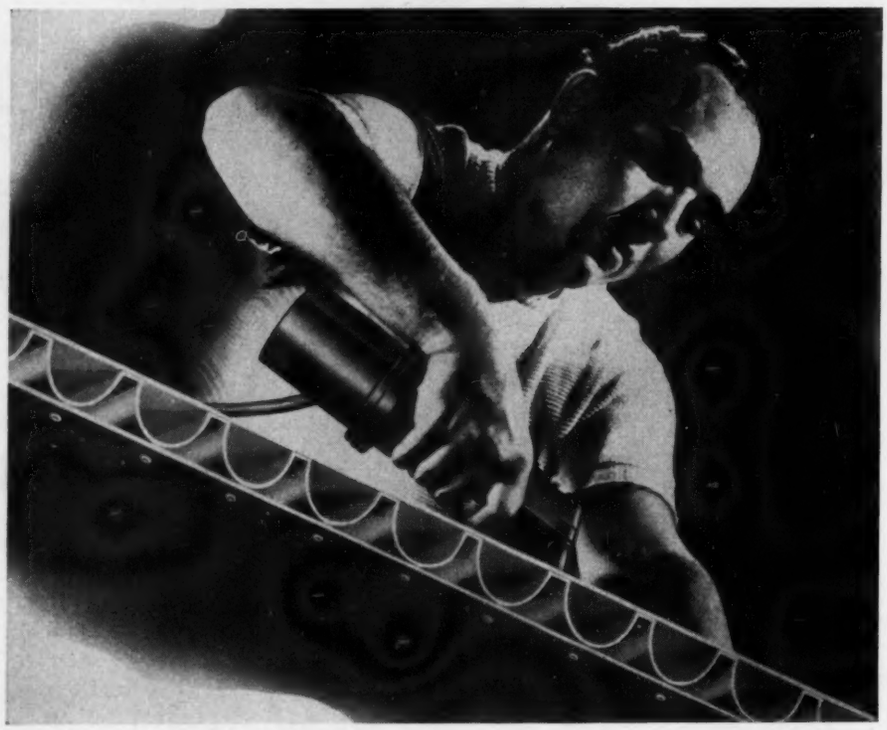
The fastener, made by Cherry Rivet Co., Los Angeles, not only is suitable for parts of assemblies where space restrictions prevent use of a bucking bar, but has been so easy for a single operator to set that considerable savings in man-hours are reported. Spoilage of materials due to uncontrolled shank expansion or shattering on impact is also said to be reduced to a minimum when this method is applied to conventional riveting operations as in radio, automotive, sheet metal, plastics, heating and ventilating, and electrical fields. Materials other than metals that can be fastened with Cherry rivets include plastics, rubber, leather, fabric, enamel-coated surfaces and plywood.

Use of Monel has been found to offer special advantages. This high nickel alloy's resistance to rust and corrosion, plus its high shear strength, makes it a suitable material for applications where stressed parts face these conditions and, in addition, where there is necessity for a strong metal-to-metal joint.

Both the pull-through hollow and self-plugging types of rivets are produced by the Cherry concern in Monel. Both are assemblies of two members, but there are certain design features in each rivet that make it best suited to specific applications.

The self-plugging type is for conditions requiring a fastener with shear properties approximating a solid rivet. Stem of this rivet has a formed head at the base and an expanded or plug section which extends halfway up the

(*Please turn to Page* 142)



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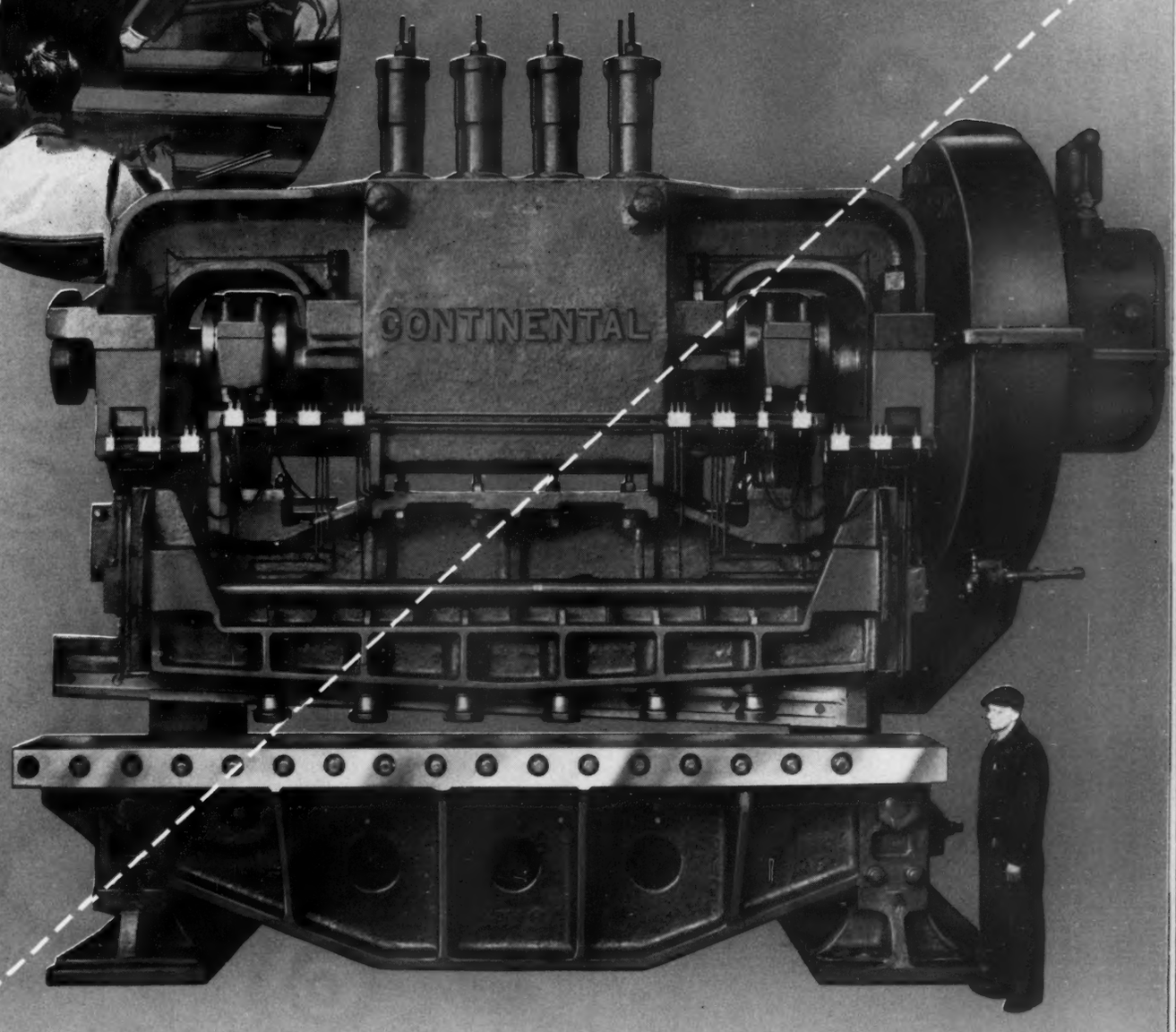

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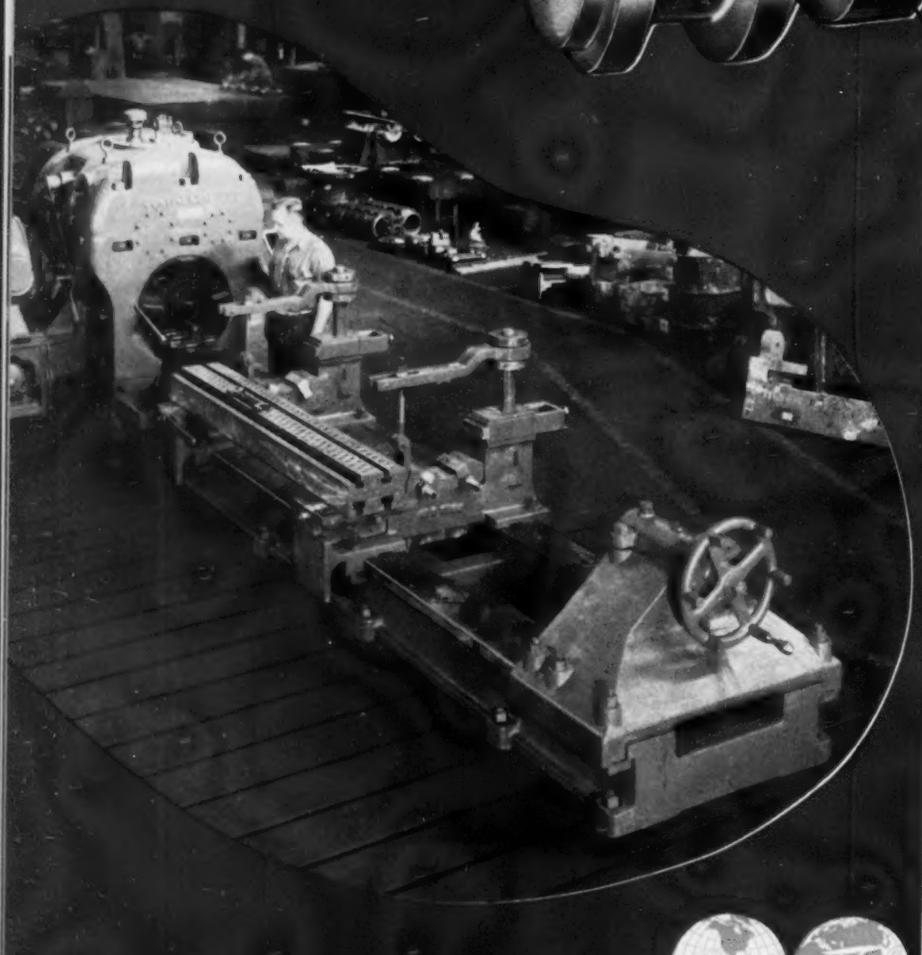

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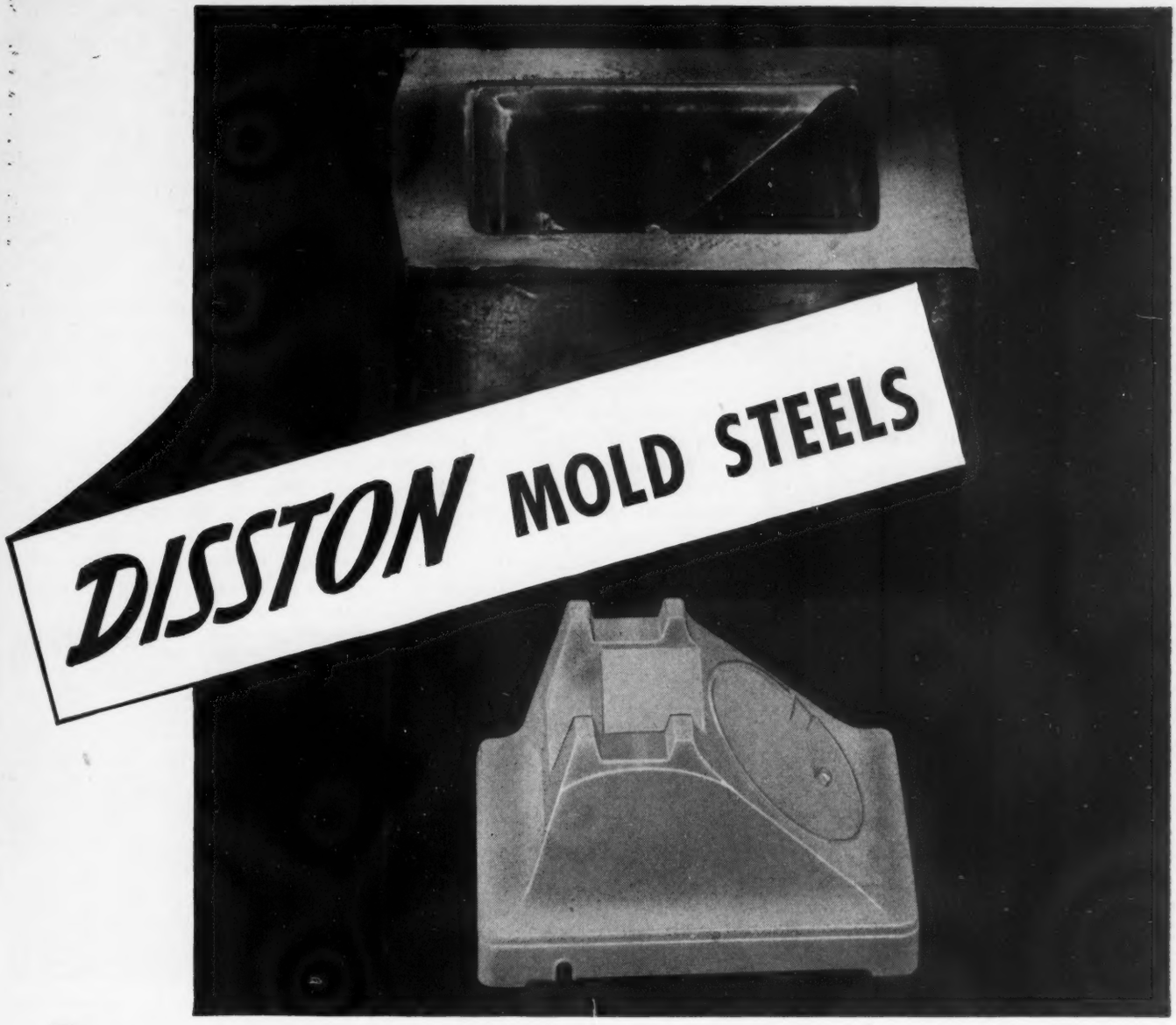

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● Disston specializes in three different types of mold steels, which meet practically all requirements. They are made of carefully selected raw materials in electric furnaces by modern steel practice with every process under rigid control. All are melted and hot-worked with great care, and are thoroughly inspected to assure freedom from porosity and inclusions. Each is uniformly sound, carburizes evenly and produces unusually smooth cavities.

DISSTON PLASTIRON is a low carbon iron that withstands extreme hobbing. Recommended for difficult shapes and short runs.

DISSTON PLASTALLOY is a low carbon steel containing sufficient nickel and chrome to assure great core strength and resistance to wear, yet permit easy hobbing. Recommended for medium runs.

DISSTON PLASTIKUT is a "cut mold" steel with alloy content for maximum core and case strength. Because of its hardness, Plastikut must be machined instead of hobbed. But its ability to stand up under long runs makes its use economical.

Write for folder which tells what to look for and what to avoid in selecting mold and hob steels. Also contains analyses of Disston Mold and Hob Steels and other information.

Disston metallurgists and engineers will be glad to help you in finding the solution of your mold and hob problems.

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STEEL: Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

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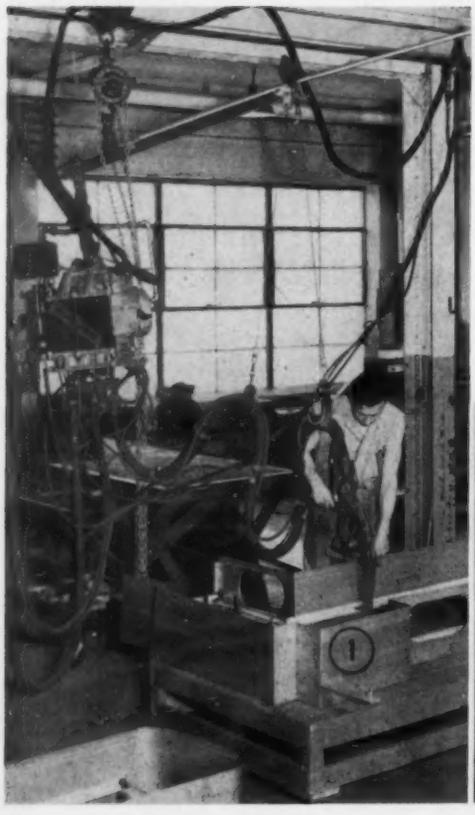
. . . improves appearance of sheet metal signs

REDUCED construction time and improved appearance of the final product are said to have resulted from the use of resistance welding by one of the largest producers of sheet metal display signs. Materials used for the signs include stainless, galvanized, mild steels, etc., depending upon individual product requirements.

There is also considerable variation in weights of the different kinds of sheet, including gages from 24 to 16. Structural steel reinforcements and support members are up to ⅛-in. thick.

Resistance welding equipment used at the Detroit plant of Walker & Co. was produced by Progressive Welder Co., Detroit, to meet Walker's product design and manufacturing problems. Fig. 1 shows the welding of reinforcements and mounting brackets in a sign box. This C-gun has 12 in. throat depth, ample to take care of the deeper sign boxes, which run up to 10 in. in depth, yet sufficiently small to permit easy handling.

Fig. 2 illustrates the standard rocker arm welder being used to spot weld clips to stainless steel letters, which later will form a large sign. This particular welder is used for a great variety of purposes in the production of signs. Extra long adapters and especially long electrodes make it possible to use the machines for work requiring a considerable amount of throat depth to clear flanges.



Shipping Experiment Proves Mechanized Handling Value

Handled entirely by mechanized unit-load methods, palletized bales recently shipped by Bemis Bag Co., Minneapolis, demonstrated the adaptability of unit-load shipping for less-than-carload freight. Shipments of nine unit loads of baled bags were made, each including 162 wire-bound bales, loaded 18 per pallet.

Unit loads were strapped to 40 x 48 in. returnable pallets, furnished by the Great Northern railway, with six bands of ¾-in. 0.020-in. steel strapping, made by Acme Steel Strapping Co. Each unit load, including strapping and pallet, weighed 1950 lb.

Palletized at the factory, the bales were loaded on a semitrailer by a fork truck and a pallet-type Transporter motorized hand truck, built by Automatic Transportation Co., Chicago. At the freight depot, the transfer to the freight car was also effected by this type of equipment. When the baled and palletized bags arrived at their destination —Minot and Williston, N. Dak.—they were loaded on local trucks with Transporters which remained on the trucks during delivery to assist in unloading and storing. Although unit-load shipment of less carload freight is not a standard procedure, the railroad is conducting similar palletizing experiments at several of its freight terminals.

Use of Radiography in Industry Outlined

Contributions of radiography to industry and the diversity of its usefulness are covered in the recently published book "Radiography in Modern Industry." Issued by the Industrial X-Ray Division of Eastman Kodak Co., Rochester, N. Y., it was written by the company's research laboratories, and is augmented by reports of field representatives who serve as consultants to industry.

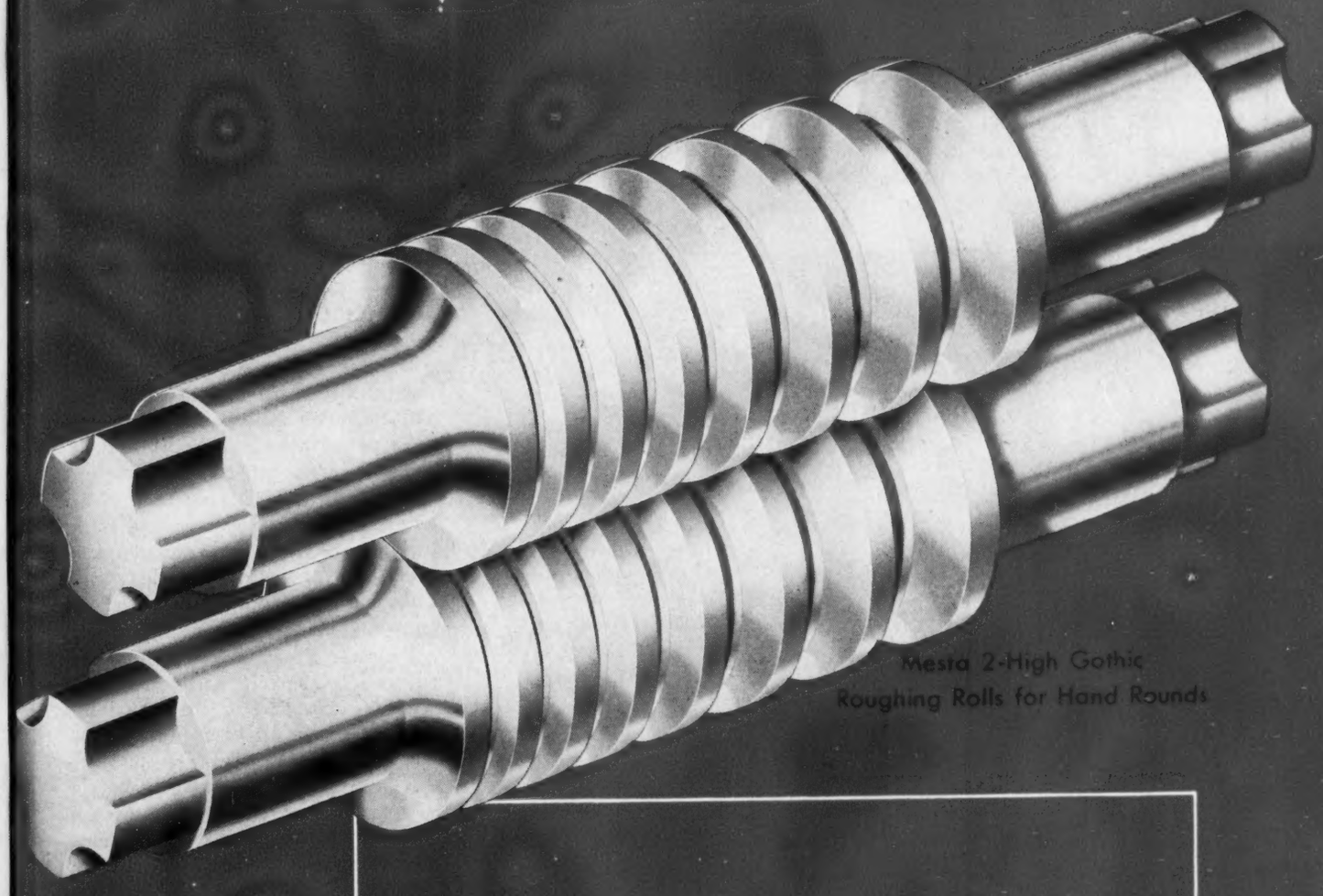
Included in the book are sections on the radiographic process, x-ray generating apparatus, geometric principles, sensitivity and detail visibility, processing, and special techniques, among others. Sensitometric characteristics, protection and unsatisfactory radiographs are covered in the appendix which also includes charts and graphs.

Alkaline Cleaner for Rust Resistant Metals Described

According to a report recently issued by Office of Technical Services of the Department of Commerce, Washington, the best alkaline immersion cleaner for rust-resistant phosphate coated metals is sodium metasilicate pentahydrate, at a concentration of 6 to 10 oz per gallon of water. At a concentration of 6 oz per gal, the compound reportedly does not corrode either light metals or zinc die castings.

Addition of 10 per cent alkyl aryl sodium sulphonate, a surface active agent greatly improves the degreasing effect, the report states. Immersion for about 10 min at 205 to 210° F is recommended. Report, PB-49262, is entitled "Alkali Degreasing Solutions."

MESTA ROLLS



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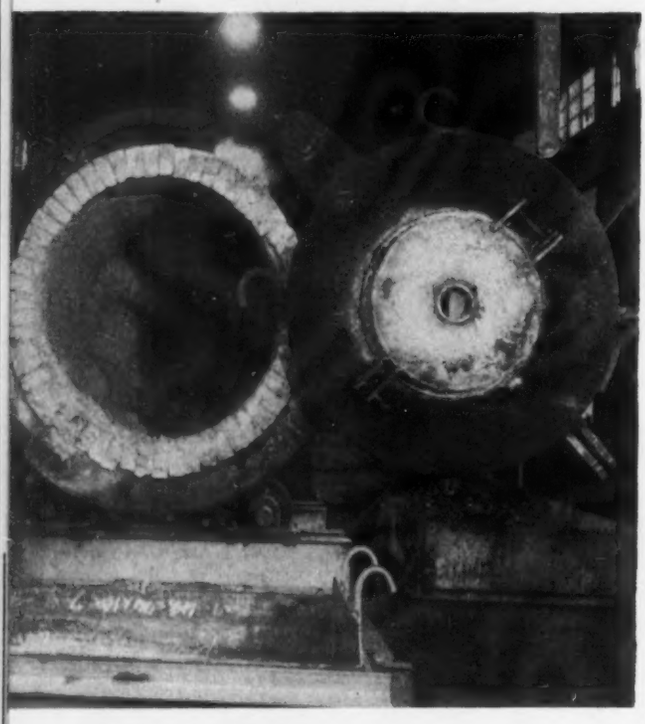
Furnace Converts Turnings into Heavy Melting Stock

Turnings subjected to tumbling action under high temperature and controlled atmosphere are balled into compact mass. Handling, charging and working turnings at open-hearth shop are minimized by process

ROCKER type oscillating furnace, for conversion of scrap turnings into heavy steel melt stock, has been developed by Steel Processing Co., subsidiary of Fort Pitt Bridge Works, Pittsburgh. This novel gas or oil-fired furnace employing the Urquhart combustion process has been operating on an experimental basis for some weeks now and is available for demonstration at the company's Canonsburg, Pa., plant.

Covering a floor area of 10 x 20 ft, the experimental unit can be operated by two men, and has a capacity of 1½ tons per hour of heavy melting stock at an approximate operating cost of $3.60 per ton based upon an average labor and fuel cost. It is estimated the operating cost could be more than absorbed through savings in the charging time of open hearths. The size of the furnace can be varied to meet specific plant requirements.



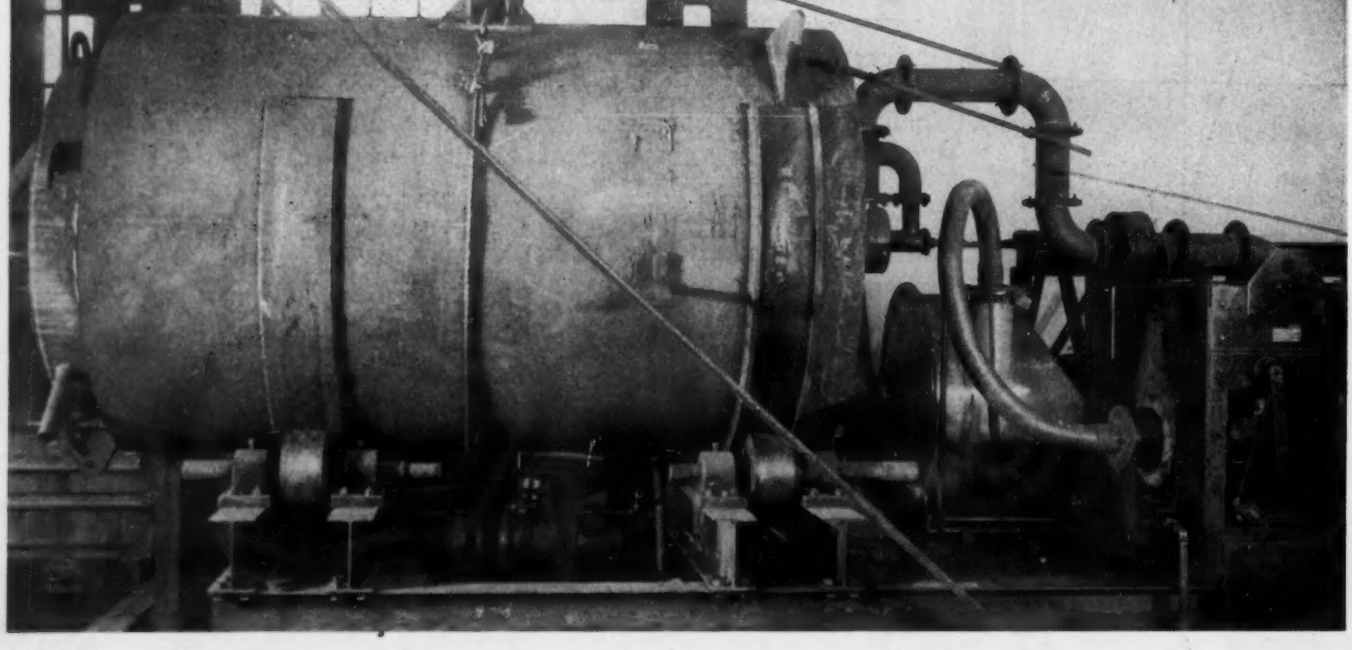
Left — Discharge end of rocker-type furnace

Below—Side view of experimental oscillating furnace which changes turnings into a compact mass

By J. C. SULLIVAN
Pittsburgh Editor, STEEL

Operating principle of the unit is that the oscillating action under high heat and controlled atmosphere tumbles the turnings and densifies them. Continuation of the rocker action after the turnings get to a plastic heat forms some of the turnings into a compact mass and as the ball increases in weight it picks up additional turnings similar to a rolling snow ball, until the entire turnings charge forms into a compact mass.

Furnace to date has been operated within a temperature range of 2000 to 2700° F, depending on the composition of the turnings. Oil is burned out of the turnings while they are still loose and porous, thus eliminating the explosive facts of turnings physically condensed as in mechanical baling. Actual percentage from the use of the lumped



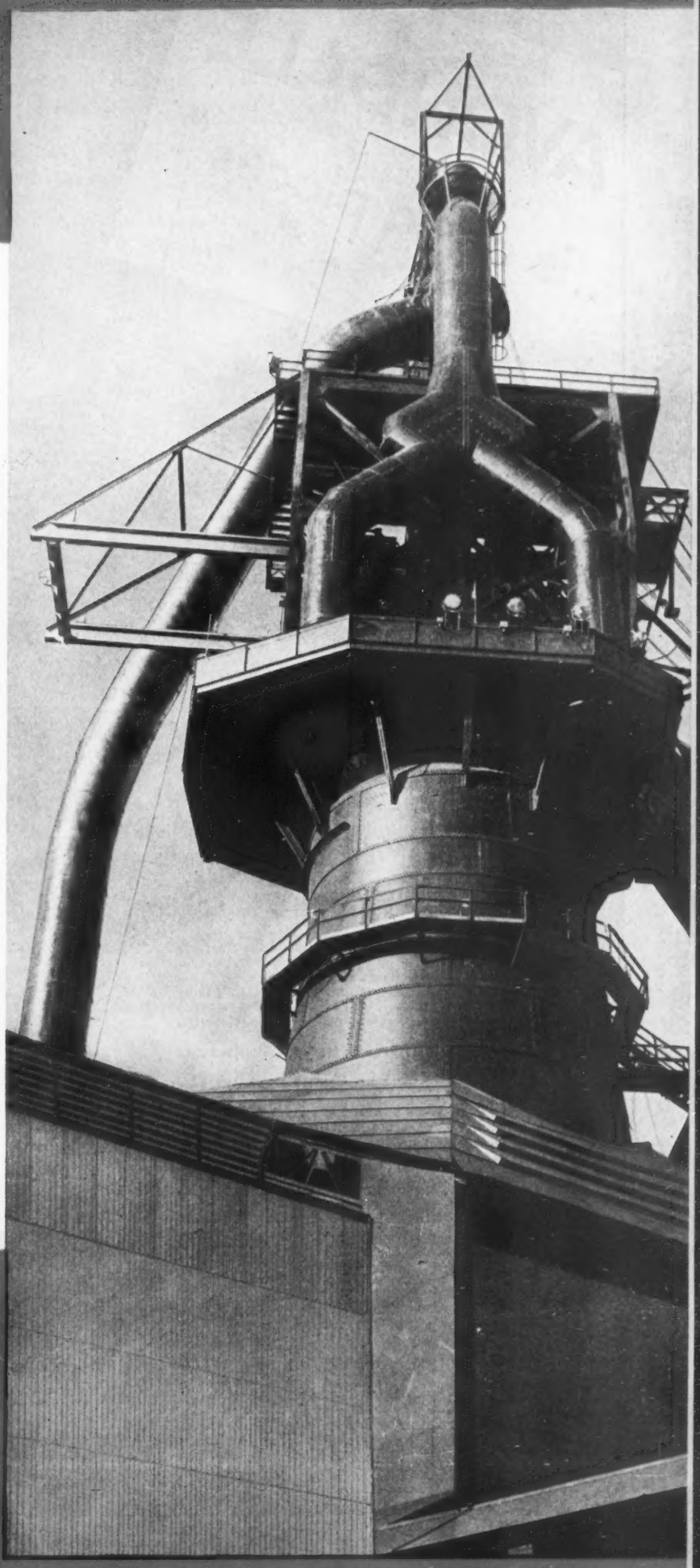
NUMBER 6 IN A SERIES OUTLINING McKEE SERVICES TO THE IRON AND STEEL INDUSTRY IN RECENT YEARS

BLAST FURNACES

BACK in 1931 a pig-iron producing record which endured for eleven years was established by a McKee-designed blast furnace.

Since 1942 that record has been broken seven times—six times by McKee-built furnaces. The present record for a month's production—50,590 net tons—is held by a blast furnace designed and constructed by Arthur G. McKee & Company.

We know of no better evidence of the value of McKee design, engineering and construction than these consistent, record-breaking performances of McKee-built blast furnaces.



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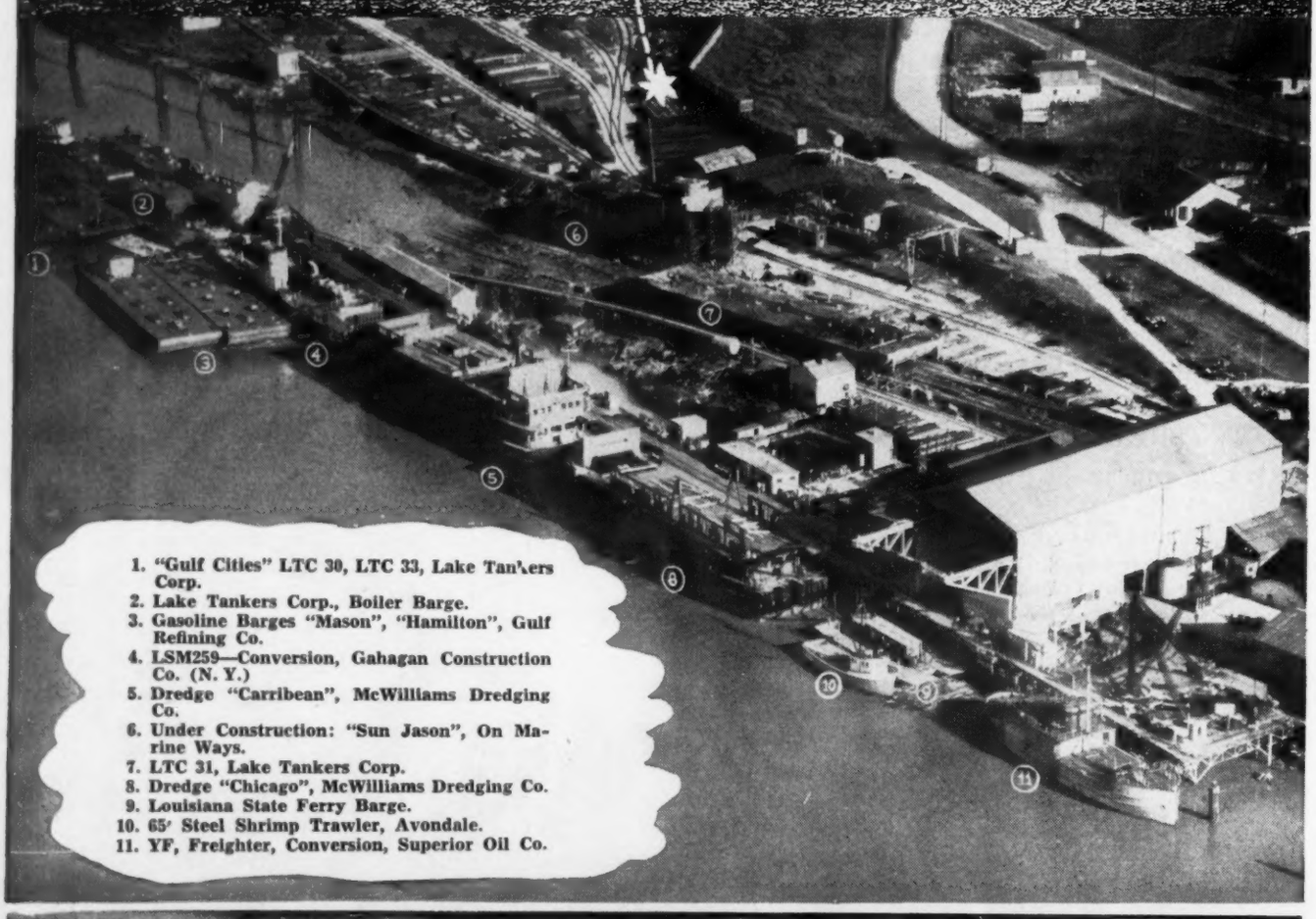

1. "Gulf Cities" LTC 30, LTC 33, Lake Tankers Corp.
2. Lake Tankers Corp., Boiler Barge.
3. Gasoline Barges "Mason", "Hamilton", Gulf Refining Co.
4. LSM259—Conversion, Gahagan Construction Co. (N. Y.)
5. Dredge "Carribean", McWilliams Dredging Co.
6. Under Construction: "Sun Jason", On Marine Ways.
7. LTC 31, Lake Tankers Corp.
8. Dredge "Chicago", McWilliams Dredging Co.
9. Louisiana State Ferry Barge.
10. 65' Steel Shrimp Trawler, Avondale.
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turnings as melting stock is not yet determined, but an accumulation is now being made of a sufficient tonnage to institute the scrap charge in an open-hearth furnace.

No major adjustments are necessary in present method of scrap handling for the furnace is constructed so it can be placed under steel plant yard cranes. Instead of putting turnings into charging boxes and moving directly to open hearths, it is proposed that turnings be taken from the railroad cars, put directly into the furnace, and where feasible, the resultant heavy melting stock could be immediately charged into the open hearths. If immediate charging into the open hearths is impractical the heavy stock could be stored in about one-tenth the present storage area needed for equivalent metallic content of turnings.

Experiments are now being planned whereby the densified product from the turnings furnace will be placed hot in a so-called intermediate furnace with other heavy melting stock. Then the combined preheated charge from this movable intermediate furnace would be transferred directly into an electric furnace. The advantages of such a process would be two-fold. First, the time saved in a melt cycle due to preheating the charge would serve to increase the electric furnace capacity of a plant, and secondly, the damage to the furnace walls inherent in the melting of cold charge in an electric furnace would be to a large extent eliminated.

Every minute saved in charging an open hearth results in increased steel production. Thus it is claimed that the use of this furnace in plants committed to a percentage of turnings in the charge will increase steel production capacity, an equivalent of one furnace for every eight in operation. This contention is based on estimate of company officials that to obtain an equivalent metallic content of one charging box of heavy melt stock from the turnings furnace, 10 charging boxes of turnings in normal form would be necessary. Thus the handling, charging and working of 9/10 of the boxes of turnings are eliminated, resulting in substantial savings in time involved in charging the open hearths.

It is also pointed out that in the melt down of the turnings charged into the open hearths under normal practice, heavy oxide coatings develop as the turnings shrink, slowing up the heat absorption and the overall time of melt in the furnace. Another advantageous factor to be considered for the use of turnings in this form is that normally when turnings are used charging almost to the furnace roof is necessary which causes damage to the roof in initial melting stage.

Company officials believe this furnace also has practical application in large machine shops, particularly automotive, which have a large tonnage of turnings as a by-product. Use of this furnace would not only help in keeping an accurate classification of turnings at point produced, but companies would net considerably more money for their scrap. Here too the matter of reduction in necessary storage facilities is a factor, in addition to reducing the loss of metallic content through oxidation.

Palletization

. . . stressed as effective method of cutting costs

INCREASINGLY cost conscious because of rising wages, increased prices and, in many cases, lowered productivity, many companies are finding that a wartime development offers great possibilities for cost reduction in materials handling. This development—palletization, or the fork truck-pallet combination—was given great impetus by the greatest handler of miscellaneous commodities in the world, the United States Army, which purchased over 6000 fork lift trucks and some 6,000,000 pallets, according to John D. Sheahan of Drake, Startzman, Sheahan, Barclay Inc., New York.

Speaking before the production conference of the American Management Association held in New York recently, he related that the Army estimated its mechanical handling techniques took the place of 25,000 laborers who were not available. It was found that practically every item in its depots could be palletized in storage and the majority could be shipped on pallets. The Army estimated that 30 per cent more supplies could be stored in the existing space, saving construction of additional warehouse space.

Virtue of palletization, he continued, is that it permits multiple small units to be combined and handled as one large unit. This procedure fulfills one of the desires of the ideal materials handling system—that of moving with the fewest possible motions and making each one accomplish the largest possible unit of work. It is apparent that if an appreciable distance is to be transversed, which in turn involves travel time, the combination of individual pieces on some kind of a carrying unit would accomplish this end.

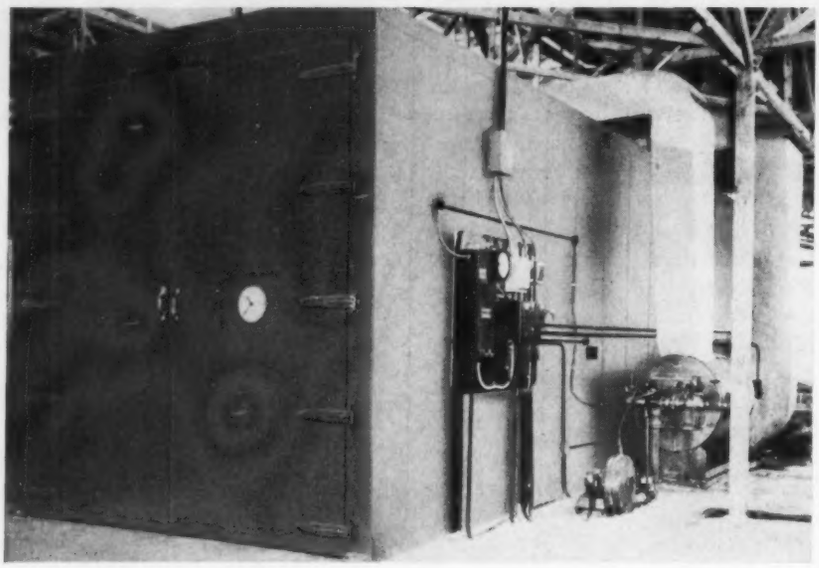
Using the fork truck and pallet method, the pile is made at the source by loading a pallet and moving a whole section of the pile to a new location, eliminating the necessity for double handling of the individual packages.

Fallets and their handling by fork lift trucks have, in the opinion of Mr. Sheahan, brought about major changes in the layout of American factories. The former straight line production systems have been or are being converted to efficient departmental systems of grouping machines. Where a number of related production sequences are carried on, the application of this type of equipment, including pallet jacks and hand lift trucks, is almost uniformly indicated. Material can be delivered quickly and economically either from the storage area or from zone banks which have been set up to compensate for the variation in duration of different manufacturing operations.

Flexibility of material movement and the departmental system of grouping machines usually permits a much higher utilization of floor area. Parts may be brought to the machines from other machines as required; the increment of replenishment is under close control.

Before considering changes in a handling system, it should be determined whether the best possible job is being done with existing facilities and equipment, he stated. True, mechanization of materials handling will bring about many economies and increased production, but more harm than good may result from superimposing a new type of mechanized operation on a disorganized department.

The speaker went on to give the following steps which he thought should be taken to bring the handling of materials in production up to the standard of the production itself: (1) Organize the physical distribution functions so that they head up to one man who himself is on a level high enough that he can participate in top management counsels; (2) apply the same standards of technical qualifications to key personnel in the physical distribution department as are applied



OVEN BAKING
BUS BODIES

COMPLETELY assembled except for tires and gasoline tank, full-sized transport buses are finish-baked in a large oven in one of the plants operated by Industrias Metalicas S.A. of Monterrey, Mex. Built by Despatch Oven Co., Minneapolis, the rectangular batch type unit is heated by a forced convection system. Chamber is 40 ft long, 13 ft wide, 13 ft high.

The Mexican firm loads a bus body on two supporting dollies, applies the prime coat, and pulls the entire unit into the oven prime chamber, saving considerable time and handling effort. After baking at 350° F for 1 hour, doors in opposite end of chamber are opened and the bus body removed. This procedure allows straight line handling through the oven. Final finish coat is baked at a lower temperature, 300° F for 30 min.

Oven also is used in finish-baking other products made by the company, such as steel office furniture, chairs and filing cabinets. For this type of work, an overhead monorail is suspended from the top of the oven chamber to simplify and facilitate handling.

Heat source is a 1,000,000 Btu natural gas fired Despatch heater mounted on the floor outside the oven chamber and adjacent to the oven (shown at right in photograph). Heater is interconnected to a high-volume fan and specially size heat distributing ducts equipped with adjustable ports to allow control of heat-flow. These ducts extend along side walls of oven while recirculating ducts are in the ceiling.

to production or sales departments; (3) pursue a policy of constant research, i.e., time and motion studies on materials handling, set up job descriptions and job evaluations, establish production standards as done elsewhere in the plant; (4) establish liaison between physical distribution department and all other departments concerned; (5) select equipment suited for the job, starting first with a study of all operations, then going into what equipment is needed, nature of facilities, floor load capacities, ceiling heights, volume of material to be handled, intermittent or steady flow, etc.

Standardization Said to Save Production Time

Economic, social and security values are enhanced through the use of standardization—the device which makes it possible for manufacturers to produce and distribute goods at a lower value to raise the standard of living, and which increases interchangeability and simplification with consequent savings in production time as experienced by the armed services.

These facts were pointed out recently by Brig. Gen. Donald Armstrong, assistant to the chairman of the executive committee of the American Standards Association, in an address before the Business Problems School of the Chicago Association of Commerce and Industry. He went on to quote an example given by A. W. Robertson, chairman of the board of Westinghouse Electric Corp., who stated his company found it possible to assemble the 30,000 types and ratings of motors from only 126 standard parts, as against the 2800 parts previously required.

In the experience of Electro-Motive Division of General Motors Corp., the general said, C. R. Osborn, vice president of the company reports that, among other parts, pistons and traction motors for diesel engines are interchangeable whether used in the switch engine, streamliner or freight engine.

In the opinion of Armstrong, industry should set up a standardization program which should include the following objectives:

To think continually of increasing and improving standard and simplified practice; to remember the actual and potential shortages of our raw materials and, so far as possible, avoid the use of materials in short supply or not available in this country; to use standard components.

Heat Resistant Castings Specifications Developed

Tentative specifications for corrosion resistant and heat resistant iron-chromium-nickel alloy castings for general applications have been developed by the subcommittee on castings of American Society for Testing Materials technical committee A-10.

Grades covered in the specification for heat resistant castings are general purpose alloys. Committee points out that no attempt is made to include heat resistant alloys for special product applications. Twelve grades are covered in the specification for materials for corrosion resistant service, all indicated as suitable for broad ranges of applications and for a variety of services.

—o—

Standard equipment on the drafting machines announced by V & E. Mfg. Co., 758 Fair Oaks avenue, Pasadena, Calif., are band covers which protect the bands, exclude dust and dirt and improve appearance. They are designed of steel so that they do not interfere with drafting heat flexibility. Brackets, band covers, support and clamp are finished with a metallic blue-green finish for eye ease.

Changing Flywheels to Welded Steel

BY L. C. BEATTY, PRES.
BEATTY MACHINE & MANUFACTURING CO., HAMMOND, IND.

In machining flywheel castings for our punches and shears, we occasionally ran into blow holes which necessitated scrapping of the flywheel and resulted in a loss of the machining man-hours. These unfortunate experiences led us to develop a line of welded flywheels built from homogeneous steel plate.

CUTS COST 20%

Not only have we eliminated former scrap losses, but we have cut the cost of our flywheels about 20% with the welded construction.

One of the cast iron flywheels is shown in Fig. 1. A welded flywheel is shown in Fig. 2.

Fig. 1. Flywheel of cast iron construction used formerly.

Fig. 2. A 50" welded steel flywheel after machining.

HOW IT IS BUILT

The 50" flywheel shown in Fig. 2 is built as shown in the sketch of Fig. 3. Interior fillet welds are made with the wheel in the flat position with one pass of ¼" Lincoln "Fleetweld 11" Electrode. The deep-groove welds that join the outer plates to the web are made downhand with the wheel in a motor-driven fixture as shown in Fig. 4. The grooves are filled with ¼" "Fleetweld 11".

We expect soon to install a "Lincolnweld" automatic outfit to make all of these welds. This equipment should reduce the cost of our flywheels even further.

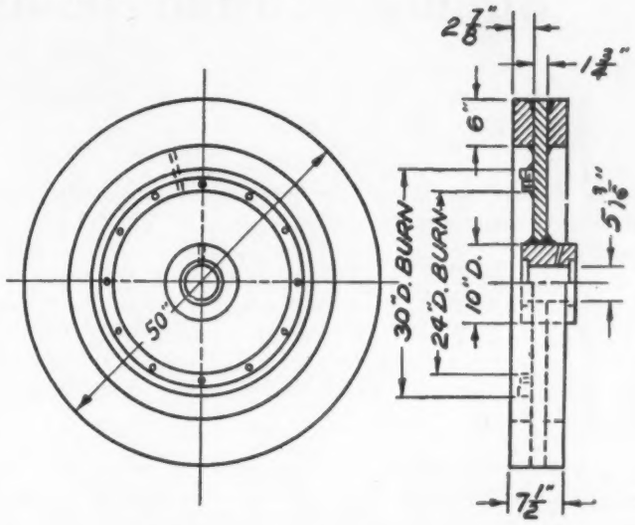


Fig. 3. Construction of welded steel flywheel.

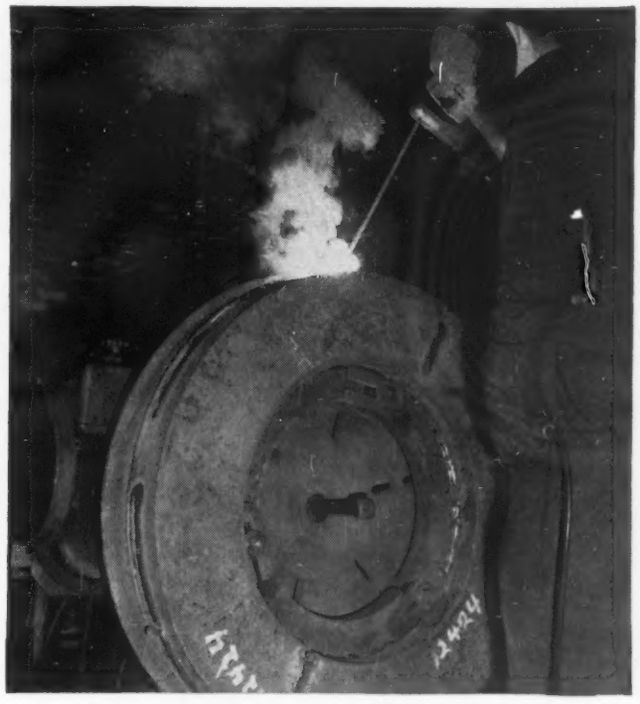


Fig. 4. Welding flywheel in fixture.

Flywheels comprise just one of many parts for our shears and presses which we have changed over to welded steel design. In this development work we have found it helpful to have the Machine Design Studies published by Lincoln Electric. These may be obtained by writing The Lincoln Electric Company, Dept. 157, Cleveland 1, Ohio.

Advertisement

GAGE LABORATORY

Standardization Center

FOR MEASURING AIDS

TO industry, the gage laboratory is what the "bridge" is to the modern ocean liner.

For this reason the equipment in a gage laboratory must be chosen with care, and always with the thought in mind to what service it is to render, according to J. Manuele, director of quality control, Westinghouse Electric Corp., East Pittsburgh, Pa.

In this day, when machining and grinding operations are controlled to tenths of thousandths, it is necessary that measuring equipment be provided with sufficient sensitivity and ruggedness that measurements might be made to such close tolerances by shop people, he said. It is necessary that these instruments be calibrated and kept in perfect adjustment and it is the function of a gage laboratory to perform these operations.

General view of the Westinghouse gage laboratory. Air-conditioned room is maintained at a temperature of 68°F and relative humidity at about 40 per cent

True function of a laboratory is not to measure, or gage production parts—these should be measured in the shop, tool room, or wherever they are produced, he asserted. The laboratory should serve as a standardizing agent for the calibration and standardization of measuring and gaging equipment.

Mr. Manuele's version of a gage laboratory is one that is equipped with universal measuring devices, which are either self-calibrated or which may be calibrated directly by the use of gage blocks. Measuring machines which have calibrated scales built into them are desirable. All instruments used in the laboratory should, in his opinion, have built into them provision for proper magnification, so that the use of external microscopes and other devices for taking proper readings is eliminated.

Advantage of operating a properly equipped gage laboratory comes from the elimination of misunderstandings between departments, plants and customer-vendor relationships by assuring that gages and measuring instruments used by inspectors are always properly calibrated. He stated that the person in charge of the quality control laboratory should understand this function and should appreciate fully the importance of his position. It is his belief is that the gage laboratory, as a standardizing agent, should be equipped to measure to a millionth of an inch, in order to calibrate modern electric gages.

Stainless, Heat Resisting Steels Subject of Book

Stainless and heat resisting steels, are covered in detail for the nontechnical reader in the recently published book, "Stainless and Heat-Resisting Steel," written by Edwin Gregory and Eric N. Simons.

Published by Hutchinson's Scientific & Technical Publications, London, the book begins with a classification from the metallurgical point of view of the various types of steels. It provides a comprehensive discussion of the methods of working and heat treatment, as well as the properties and applications of each.

—o—

Advantages of porcelain enamel on steel—color, texture, durability, abrasion resistance, thermal shock resistance, light reflectance, incombustibility and acid resistance—for both exterior and interior applications are covered in the 32-page two color brochure, "Porcelain Enamel on Steel in Architecture," issued by Carnegie-Illinois Steel Corp., Pittsburgh.

Methods of End Quench Testing Revised by ASTM

Methods for end quench testing for determining hardenability of steel have been revised along with tentative specifications for bearing steels, by two subcommittees functioning in Committee A-1 on steel, of American Society for Testing Materials.

The primary objective in the hardenability test is to bring the description of the procedure, and the details to be followed, more nearly in line with SAE recommended practice.

The revised tentative specifications for bearing steels bring these up to date, with more extensive changes involving the methods of testing. More precise requirements are given with respect to fracture, macroetch and inclusion rating. The section on microstructure and hardness has been clarified.

Application of L-P Gas Plants Subject of Paper

Warren C. Meyer, resident engineer of Stacey Dresser Engineering of Cleveland presented a paper entitled "Application of Liquefied Petroleum Gas Plants to the Gas Utility Problems" before the convention of Gas Meters Association of Florida-Georgia in their recent meeting in Boca Raton, Fla.

Prepared by Meyer with the assistance of Irving Resnick, senior process engineer of the company, the paper outlined the performance, characteristics and proper utilization of L-P gas. The problem of supplying the increasing demand for this type of fuel, which is often a seasonal and a perplexing peak load, requires careful investigation, the paper stated.

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High Temperature Steel

(*Concluded from Page* 101)

The temperatures involved in normal steam turbine practice are not sufficiently high for creep strength to be considered, but because Stayblade steel had better creep resistance than any previous steel, it was adopted. A typical analysis of Stayblade steel is as follows: C—0.22 per cent, Si—1.0 per cent, Mn—0.60 per cent, Cr—20.0 per cent, Ni—8.5 per cent, Ti—1.2 per cent.

Normal heat treatment consists of air-cooling from a temperature of 1050° C followed by reheating for 1 hour at 800° C, from which temperature the material is again air-cooled. Typical tensile tests at normal and elevated temperatures are shown in Table I. It will be noted that the proof properties are substantially maintained at a temperature of 500° C and are still quite good at 600° C. The steel possesses a useful degree of fatigue resistance and at normal temperature has a fatigue range of plus or minus 21.75 tons per sq in. based on the Wohler test.

Perhaps the most important property required in a steel for rotor blades is that of resistance to creep. These blades are subjected to very high stresses due to centrifugal loading, and as the efficiency of a turbine is affected to a large extent by the clearance between the tips of the blades and the shroud ring, this clearance must be kept as small as practicable. It will therefore be apparent that the amount of "stretch" which is permissible in a rotor blade is of a very small order.

Stayblade steel was ultimately replaced for blades in the Whittle engine by R.ex 78 steel, marking a considerable advance in properties at elevated temperatures. In addition to blading for the Whittle type engine, this steel was also supplied for the production of blading for the Metropolitan-Vickers' and De Havilland engines. Most of the development work on the De Havilland engine was done on rotor disks and blades made from this material.

R.ex 78 steel was developed by Firth-Vickers for heat-resisting purposes from a series of acid-resisting steels and was first made in April, 1936. At the time of its adoption for the gas turbine project, it constituted an improvement in creep resisting materials. This steel is a complex alloy, a typical analysis of which is as follows:

C—0.7 per cent, Si—0.70 per cent, Mn—0.80 per cent, Cr—14.0 per cent, Ni—18.0 per cent, Mo—3.75 per cent, Cu—3.6 per cent, Ti—0.65 per cent.

Resistance to creep of R.ex 78 steel is illustrated on the basis of the "time yield" test by the following values:

Temp. °C	Tons per sq in.
400	19
500	18
600	15
700	6.5
800	1.75

Ring components are made in H. R. Crown Max steel. These items are produced as centrifugal castings. By this process, it is possible to produce economically sound cylinders from which a number of rings can be parted off and then machined to the requisite section. Prior to the application of this casting process, it was necessary for the components in question to form bar material to ring shape, weld the joint, heat treat to remove bending and welding stresses, and then machine to the desired section.

The centrispinning process, therefore, effects considerable saving in time. Rings up to 44 in. diameter have already been cast by this process, and provision has been made for the production of still larger rings. Hitherto simple rings and cylinders of the type in question were cast in chill molds, but developments with refractory molds, together with modified techniques, now enable complicated sections to be produced satisfactorily.

From *Iron & Steel*, August, 1946.

—o—

Ability to obtain a leakproof 37-degree flare, and assemble a fitting in one operation is possible with the Everseal self flaring fitting made by Everhot Products Co., 2001 West Carroll avenue, Chicago. A brass fitting which flares steel, it may also be used with copper, aluminum, Monel or Bundyflex.

Industrial Paint Tests Expected To

Decrease Maintenance Costs

INDUSTRIAL maintenance costs stand to undergo a considerable reduction as a result of a program of field research in industrial paints being conducted at Freeport, Tex., by Dow Chemical Co. and Sherwin-Williams Co., Cleveland. Primary reason for the tests is to determine the exterior paints most suitable for the huge chemical plant of Dow in Freeport. The findings, however, are expected to provide scientific data on industrial paints which may be applied in many other industries.

Experience has shown that paints used heretofore were unable to withstand the severe exposure conditions caused by atmospheric and industrial fumes which accompany production of bromine, magnesium, synthetic rubber and ethylene products. Five years has been found to be the average life of industrial paint, it was stated, but few of the finishes used by this Texas plant had any protective quality remaining after 12 months.

Fifty-nine different primers and finishes and some 1500 paintouts and test panels—located in 10 different areas having critical and characteristic but different chemical and atmospheric conditions—are being used by Sherwin-Williams and Dow research chemists. Chemical fumes and deposits of chlorine, hydrochloric acid, caustic, magnesium chloride, lime and others are being used in testing these panels.

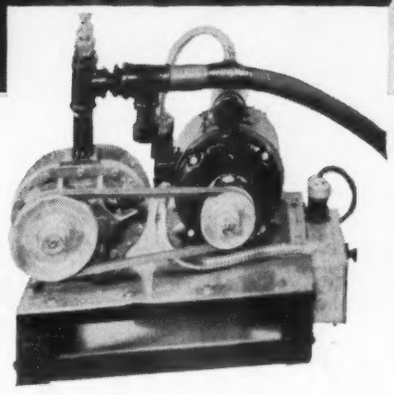
Three months of laboratory study involving the testing of an almost endless number of pigments and vehicles for their specific resistance to the various fumes and other conditions that are present at Freeport preceded actual formulation of paint samples, it is related. Pigments and vehicles have been selected for their relative effectiveness without regard to proprietary claims or opinions.

Fourteen different types of metal primer are being used in the tests, illustrating various pigment combinations and thus providing a means of comparing each material under a wide variety of conditions. These primers range from red lead through the chromate pigment types, zinc dust types, Navy specifications and include various kinds of vehicles, including the recent developments such as chlorinated rubber, vinyls and acrylics.

Durability of color is being studied closely inasmuch as the plant has adopted a scientific color scheme—vermillion, blue-green, light gray, black and white—for buildings, lines, tankage and other equipment. Finishing coat materials as in the case of primers, involve a variety of pigment combinations, each in the same vehicle and a number of different vehicles with the same pigment combination, it is stated.

Knowledge of the fact that paint maintenance costs in the Dow Freeport plant amount to hundreds of thousands of dollars per year gives an idea of the savings that could be made if paint durability improvements are effected, the chemists point out.

by R-C dual-ability



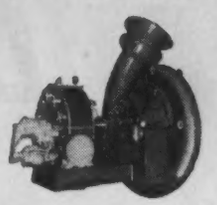
When selecting air or gas-moving equipment, watch that most important point of matching it to the job. Capacity, pressure, drive, size, weight and other factors must be carefully considered, to give you satisfactory operation.

That's where R-C *dual-ability* goes to work for you. With small-to-large sizes and many styles of both Centrifugal and Rotary Positive designs, we can be completely unbiased in our recommendations. For instance, coke oven operation called for the large Centrifugal Exhauster illustrated (top, above), with capacity of 16,850 CFM. The compact, lightweight Rotary Positive unit exactly meets the need for a low-capacity, portable vacuum pump in the graphic arts industry.

Similarly, your needs can be *matched to a "T"* with our small or large Centrifugal or Rotary Positive equipment. Call on R-C *dual-ability* to help solve your air or gas-moving problems.

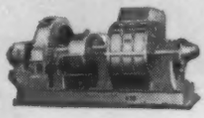
ROOTS-CONNERSVILLE BLOWER CORP.
706 Steelton Avenue, Connersville, Indiana

VARIED REQUIREMENTS OF MOVING AIR OR GAS MET BY R-C EQUIPMENT

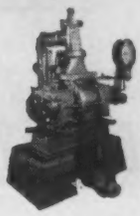


In foundries, steel and paper mills, chemical processes, sewage treatment, gas pipe lines and many widely differing jobs, R-C *Centrifugal Blowers and Exhausters* help make more goods for more people, economically.

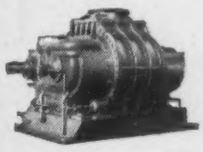
Many engineers find *R-C Rotary Positive Blowers* better matched to the job, with their ability to deliver constant quantities of air or gas, regardless of varying outlet pressures. Our small, compact units are widely favored for built-in application.



You can closely account for air or gas, delivered or consumed, when you measure it with *R-C Positive Displacement Meters.* Their built-in accuracy needs no adjustments, can't be altered accidentally or intentionally.



Wherever natural or manufactured gases are used in processing, you'll find *R-C Rotary Positive Gas Pumps* delivering accurate quantities by the minute or the hour with unfailing regularity.



• • •

Working with you or your suppliers, we'll apply R-C *dual-ability* to match our equipment to your jobs.

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Roots-Connersville Blower Corporation,
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Please send information on:

BLOWERS_____ EXHAUSTERS_____
VACUUM PUMPS_____ METERS_____
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INERT GAS GENERATORS_____
NAME_____
TITLE_____

ROOTS-CONNERSVILLE ROTARY CENTRIFUGAL
BLOWER BUILDERS R-C SINCE 1854
BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS

• • ONE OF THE DRESSER INDUSTRIES • •

Wolff Steel Service

Whatever your problem, whatever your need, Inland makes floor plates that are made to the measure of the job you have in mind. Specifically, this means a great range of sizes and weights of plate, plus variations in the four way safety projections to exactly fit your application.

In addition, Wolff Steel Service adds a new characteristic to these desirable properties . . . a friendly, human interest that runs all of the way from suggestions and ideas to cost estimates. You'll find, as thousands everywhere have, that Wolff Service offers a *real service* to you when you need bars, plates, sheets, structurals—and floor plates. Write or call.

BENJAMIN WOLFF & COMPANY
PRIME STEEL SERVICE
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BENJAMIN WOLFF AND COMPANY

General Office and Warehouse — 58th St. at Seeley Ave., Chicago 36, Ill.

Wisconsin Office — 176 W. Wisconsin Ave., Milwaukee 3, Wis.

Industrial Lighting Costs

(*Continued from Page* 105)

costs for various lighting systems in the cost-data table which is part of this article.

The objectives of profitable plant operation have been reviewed with respect to the way good lighting relates to them. And we have a general lighting plan with which we may begin a policy of good lighting practice in all manufacturing, warehouse or storage areas. Now we must take a look at some specific instances of good lighting versus poor lighting on the job. For this purpose we have selected a number of examples illustrated by the sketch-and-photo series. A careful study of these examples will help management understand how executive decisions can help to give more sense to industry's lighting dollar. Figs. 1, 2, and 3 show how.

Industry is making headway against the obstacles it faces in successful plant operation. It is taking account of contemporary conditions and doing something about them, constructively. For instance, in a number of industries attention is being given on a careful, planned basis to match the requirements of a particular job to the qualifications of a particular workman. Eyesight qualifications are a prime consideration wherever this work of relating abilities to the task is being done.

Worker's Satisfaction Important

Safety is one main objective in fitting the job to the seeing ability, but the satisfaction of the worker that he is on a job he can do well, without strain or unnecessary fatigue is an almost equal objective. Here again we see the winning combination of better machinery, better production methods, and improved morale working towards lower unit production cost and increased plant capacity. Painstaking efforts to discover what an employee is physically and mentally capable of doing in the shop takes the follow-up of equipment, know-how and team work.

Perhaps automatic processes will take over many kinds of work which at the present time are unattractive, that require special consideration or pay. While we await that possibility we must make an earnest effort to make work give the satisfactions it can give when it is organized for that purpose. Work is necessary for its own sake, and most of us respond to work opportunities which permit us to do our best. Plant efficiency is the sum of a lot of complex factors composed of management, men and machines. It may fail for want of some inconspicuous facility being needlessly neglected.

Consider the lighting, for example. In

-but it meant a

$450,000 FIRE LOSS!

Put yourself in the place of the owners of this plant. Three of your buildings completely destroyed, with a fire loss of $450,000—all because your *fire protection did not protect.*

Not a pleasant situation—

But there is another side to the fire-protection picture. We call it the "Automatic" Sprinkler side. Long years ago "Automatic" Sprinkler established a course of action from which it has never deviated *—to produce fire protection systems and devices that answer the need for complete and adequate protection, no matter what the fire hazard.*

This policy has paid handsome dividends to users of "Automatic" Sprinkler equipment. It will continue to do so. For singleness of purpose, coupled with intelligent and persistent research, has resulted in *fire protection that really protects.*

"Automatic" engineers are well qualified to help solve your fire hazard problems. Write us today.

FIRE PROTECTION

DEVELOPMENT ENGINEERING

"Automatic" Sprinkler

MANUFACTURE INSTALLATION

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
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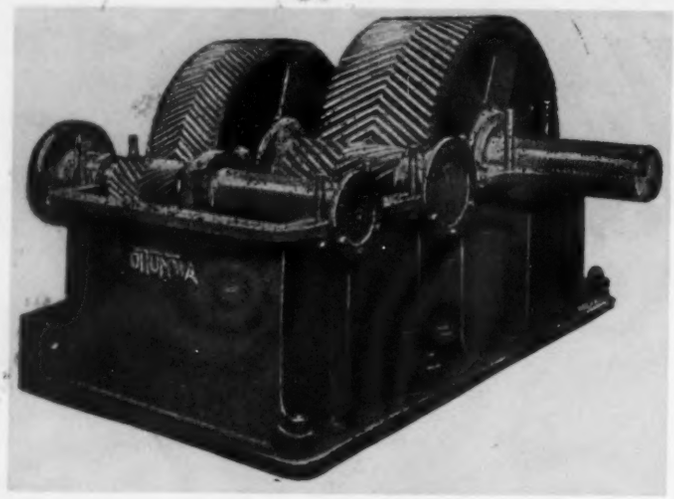
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA



Putting a principle to work

The double helical principle was well known for years, but its application was limited beyond an angle of 23 degrees. The Sykes generators impose no limits on the maximum helix angle, but the 30 degree angle was chosen as standard because this angle gives the full benefit of the helical principle. OTTUMWA cuts Sykes gears for speed reducers and increasers, and really puts this principle to work. OTTUMWA can furnish Sykes continuous tooth herringbone gears up to 10'2" dia., 24" face, and in all pitches up to 1-1/4 D.P., in steel or semi-steel. We also cut blanks furnished by our customers. Send us your inquiries. We will be pleased to recommend the proper Gears or Reduction Units to meet your requirements.

ESTABLISHED 1867

OTTUMWA
IRON WORKS

ENGINEERS • FOUNDERS • MACHINISTS

OTTUMWA, IOWA, U. S. A.

our general plan we provide for from 45 footcandles under service operating conditions. Without maintenance even our good general plan might drop to 30 footcandles. Footcandles are, of course, one rough measure of usefulness of lighting systems. Like cost figures, taken alone they tell us something about what we get for our money. They tell us, for instance, that 30 footcandles from a system designed to give 45, does not give much sense to industry's lighting dollar.

In Part 2 of this discussion we shall undertake to tell what should be done to keep the cost of owning and operating a lighting system yielding a good return with planned maintenance.

(*Concluded next week*)

Report Describes Metals Research Projects

Research projects undertaken to meet the wartime need for better metals, stronger welds and faster fabrication methods are described and summarized in the 93-page report published by the Office of Technical Services, Department of Commerce, Washington. About 100 projects undertaken by industrial, university and government laboratories are included, along with a guide to other reports which describe these studies in greater detail.

Major fields of investigation summarized in the report include welding, aircraft materials, metals for high temperature service, foundry materials and processes, armor, guns and gun steels, ammunition, examination of enemy material, properties of miscellaneous materials and conservation, substitution and processing. Number and title of report are: PB-52353; "Metallurgical Research in World War II."

Booklet Contains Basic Approach to Arc Welding

Teaching the simple basic approach to welding and assisting in applying arc welding to the repair of broken parts, the hard surfacing of worn parts and building of miscellaneous equipment is the purpose of the 32-page booklet "Learning to Weld," published by Lincoln Electric Co., Cleveland. Its 83 illustrations include typical applications of arc welding in repair and construction.

Included are conversion tables on decimal equivalents and thicknesses of metal in both gage and inches. Subjects treated include: Protective clothing and equipment, striking the arc, welding positions, types of welds, welding cast iron, hard surfacing, etc. A glossary of welding terms is included.

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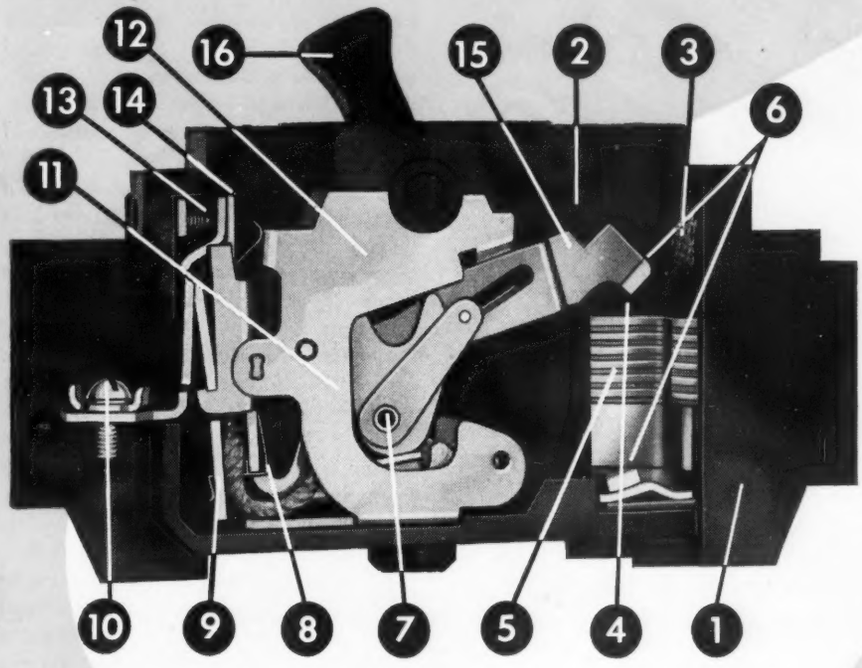
QUICK / TRIP MAKE BREAK THERMAL-*Coilless* MAGNETIC CIRCUIT BREAKER

Type ML A.C./D.C. 1, 2, or 3 Pole, 15 to 50 Amperes for Direct or Alternating Current Systems



1. Mechanism is completely enclosed in a sealed, compact, molded bakelite case to prevent tampering
2. Narrow slot for edgewise contact arm isolates arc chamber
3. Arc chamber vent screen
4. Arc suppressor chamber
5. Arc suppressor stack especially designed to instantly rupture both direct and alternating currents
6. Silver tungsten contacts brazed to contact arms and plates
7. Bearing surfaces are hardened to reduce wear
8. Stainless steel sensitive latch
9. *Coilless* magnetic trip element
10. Terminal screw for lower ampere ratings
11. Main spring (concealed) provides positive contact pressure and strong mechanism action
12. All-steel parts are rust-proofed to prevent corrosion
13. Sealed bimetal adjustment screw
14. Bimetal for delayed trip
15. Solid, high strength, high conductivity cadmium copper edgewise contact bar
16. Strong cross section molded bakelite handle

This new and vastly superior Square D thermal-magnetic breaker has a unique *coilless* magnetic tripping mechanism which causes it to open instantly on moderate as well as heavy short circuits. A quick-make and quick-break mechanism of simple and rugged construction is incorporated in this breaker to assure long life and trouble-free service.

New lines of lighting panelboards, also general purpose industrial service equipment enclosures, using these new breakers, are now available for delivery.

The ML A.C./D.C. breakers are designed for use on either direct or alternating current systems where 1, 2, or 3 pole circuits are required. They are ideal for motor or branch circuit wiring.

Write **for Information on ML A.C./D.C. Breakers.**
Square D Company, 6060 Rivard St., Detroit 11, Michigan.

Features

- HOLDS MOMENTARY OVERLOADS (thermal trip)
- TRIPS FAST ON SHORT CIRCUITS (*coilless* magnetic trip)
- QUICK-MAKE, QUICK-BREAK (manual operation)
- QUICK-BREAK (automatic operation)
- MEETS FEDERAL SPECIFICATION WP131A FOR CLASS 1 BREAKERS

SQUARE D COMPANY

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THOMASTRIP
PRE-COATED WITH ZINC
COPPER, NICKEL, BRASS . . .
HOT DIPPED TIN
AND SOLDER . . . LACQUER COATED IN COLORS . . .
UNCOATED PRECISION STRIP . . .
CARBON AND ALLOY
SPECIALTIES

Electro-Coated Parts and stampings will have uniform coating on inside AND outside surfaces.

ThomaStrip COLD ROLLED STRIP STEEL

FORMS
BENDS
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Without Fracture

Thomas electro coatings adhere to ThomaStrip to the limits at which the base metal may be drawn.

THE THOMAS STEEL COMPANY
WARREN • OHIO

New Books

Art of Coating Metals

Galvanizing Handbook, by J. R. Daesen, consulting metallurgical engineer, Chicago; 166 pages; 78 illustrations, 10 tables; published by Reinhold Publishing Corp., New York. Price $5.25.

Here is a book either for the metallurgist, the man in the shop, the trouble-shooter or the executive.

Nature and cause of various defects encountered in a consulting practice in the field of galvanizing are depicted by photographic examples. In fact many of the examples chosen were articles spoiled purposely to indicate in an extreme manner, conditions which are difficult to illustrate in a degree usually encountered in practice.

In the introduction is described in a general way the procedure followed in galvanizing sheets, pipe, wire, sheetware, wire cloth, structural shapes, pole line hardware, malleable castings and pipe fittings.

Bonding of the coating and its various ramifications are discussed as are various chemical elements which influence galvanizing. The importance of temperature control and its relation to dross formation is emphasized and the why and wherefor of spangle formation explained.

Chapters devoted to pickling and fluxing contain considerable data of value to the galvanizing operator. Cross sectional views of various types of galvanizing kettles assist the reader to visualize the essential parts of the setting. Methods of firing the pot, and drossing, skimming and cleaning the bath also are dealt with in detail.

Employees Evaluation Plan

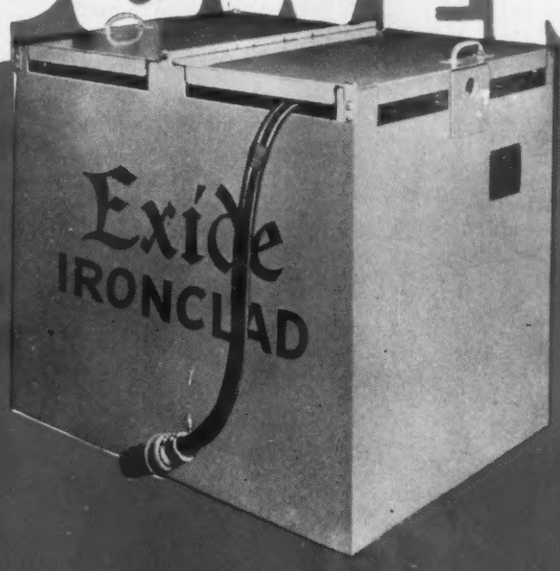
Measuring and Rating Employee Value, by John B. Probst; cloth, 6 x 9 in.; published by Ronald Press Co., New York, for $5.00.

Determination of the value of a worker to his employer should be based not only upon his actual production but also on his effect upon the organization. To measure this value many rating systems have been set up; a large number of these systems allow personal prejudices of supervisors to influence employees' ratings. The Probst Rating System, described in detail in this book, attempts to eliminate these prejudices and conduct employee evaluation on a factual and impersonal basis.

Statistical analyses of applications of the system in a number of widely divergent fields is presented. Samples of the service report forms, how they are scored and how they are correlated with other employee evaluations are included.

CRESCENT PALLETIER FORK TRUCK

DEPENDABLE POWER



CUT MATERIALS HANDLING COSTS
MOVE MORE GOODS WITH SAFETY

You can do both... and *MORE*... when you use EXIDE-IRONCLAD POWERED Electric Trucks

Wherever goods are lifted, hauled and stacked, efficient battery electric trucks and Exide-Ironclad power are effecting important economies all along the line. They do more work per man per hour and at less cost. They do it with greater ease and safety. And they maintain a steady pace straight through to the end of every shift.

Exide-Ironclad Batteries have the high power ability, the high maintained voltage and the high capacity that materials handling demands. You can always count on Exide-Ironclad Batteries for dependability, long-life and ease of maintenance.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of materials handling problems. It tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY COMPANY
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Exide Batteries of Canada, Limited, Toronto

CRESCENT PALLETIER FORK TRUCK

"Universal" Face Kennamill
For high rate face milling on reasonably modern machines. Has wedged-in, advanceable blades of solid Kennametal. Adaptable for milling different materials by interchanging blades.
"CF" Face Kennamill
Specially designed for maximum efficiency on repetitive jobs on cast iron. Has wedged-in, advanceable blades of solid Kennametal.
IT PAYS to know your KENNAMILLS
Half-Side Kennamill
For use on reasonably modern milling machines. Has wedged-in, advanceable blades of solid Kennametal. Adaptable for milling different materials by interchanging blades.
Axial Face Kennamill
For wide or deep cuts—straight, chamfer, or form—in one pass. Has Kennametal-tipped blades held in position by set screws.
Step Kennamill
For efficient carbide milling on milling machines of capacity as low as 1 H.P. Has Kennametal-tipped blades held in position by set screws.
KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc., LATROBE, PA.

Kennamilling is a new technique that enables you to obtain maximum production from existing milling machines, and to realize to the fullest extent the output inherent in the latest models.

This technique is the outcome of many years of research and experimentation by Kennametal engineers in cooperation with machine tool builders and manufacturing companies.

The Kennamills illustrated are the efficient "cutting heads"—behind them lies accumulated experience and "know-how" that is of great assistance in helping you to achieve the greatest benefits from negative rake carbide milling. Let us prove this on one of your jobs. Our representative in your district will be glad to demonstrate.

Boring

(*Concluded from Page* 100)

room use, but also are being applied to precision production operations. One of these machines of American design is shown at the center of the two-page spread at the beginning of this article. This is performing a preliminary drilling job involving exact spacing of holes which then will be precision bored at the same setup.

Production work of this character often is spaced and "spotted" on the jig borer, rough drilled close to size on an ordinary drilling machine, then returned to the jig borer for final spacing and precision finish boring. It is characteristic of America that the tool room does not for long monopolize any instrument or method or machine in which tool engineers and manufacturing men see production possibilities.

As a closing phase of this highly condensed story of the extremely broad subject of boring, I will touch on some recent developments in high speed, fine feed horizontal boring with revolving tools. Originally introduced commercially after the first World War as "precision diamond boring machines" using shaped industrial diamonds as boring blades, these machines first gained a foothold in machining bearings and other items of tough, hard or abrasive character—on which work they became to some extent competitive with internal grinding.

This process caught on quickly because it tied in well with growing acceptance of the light metals and their alloys—including die castings which require only light finishing cuts—and also because it met the challenge of tightened specifications on fit on a wide variety of parts involved in mass production.

Several companies developed machines especially for this work which are real masterpieces of simplicity in basic design and which at the same time are easy to adapt and to tool up for a wide range of high speed, fine feed machining—not only for boring either with fixed or revolving tools, but also for turning, facing, chamfering and various other operations.

These machines, many of which are built up of standard units which can be rearranged to suit the work at hand and which often are set up with multiple heads—eight being by no means uncommon—now constitute a distinct and widely accepted class of machine tools whose "coined names" now are a recognized part of the language of the shop.

These machines really came into their own in a big way with the advent of carbide cutting tools, which largely have replaced diamonds as their cutting blades and which add economy and versatility which could not otherwise have been achieved.

Two illustrations used in this article give some idea of the wide range and manifold capabilities of this new class of machines in this era of carbide tooling. The large machine at the right on the two-page spread is a "double-ender" with heavy duty heads and special fixture for handling cast steel screw machine spindle carriers weighing as much as 1000 lb.

Close Limits Are Held

This has been in use for a number of years boring and facing the spindle holes in the two disks to exact concentricity and to extremely close limits. The 8 in. holes in the four spindle carrier shown were being held to size tolerance of plus or minus 0.0003 in., spacing being held within 0.0005 in. at the time this photograph was taken.

The photograph on the third page of this article shows a smaller, single head machine tooled up for finish boring centrifugally-cast bronze propeller cones which already have been taper turned and faced in a similar machine arranged to revolve the work instead of the tools. In the multi-diameter boring operation illustrated limits of plus or minus 0.0005 in. are held both on roundness and straightness, while machining 15 pieces per hour. This illustration gives an excellent idea of the high finish attained by this method.

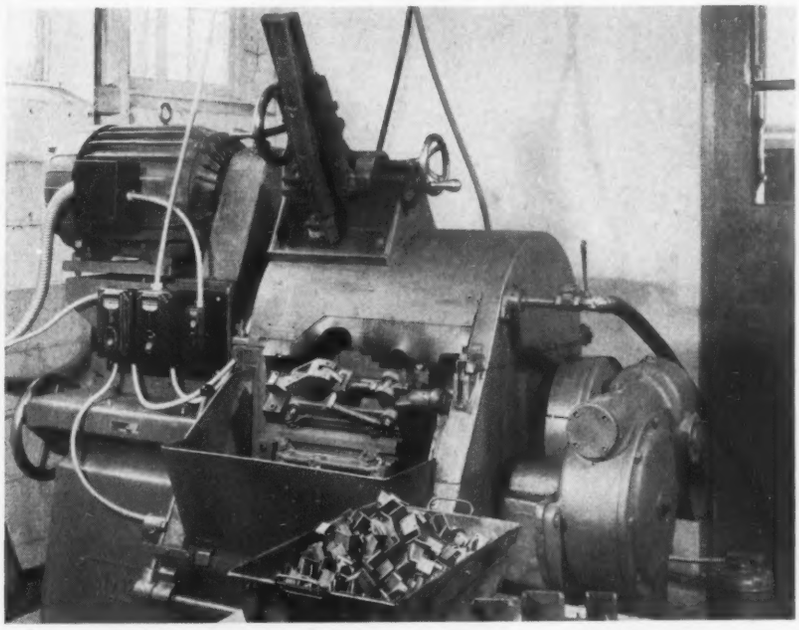
The tremendous range of boring as a shop technique is exemplified by the contrast between the precision instruments and gages used on this cone job, and the massive measuring rod being used by the operator of the 40 ft boring mill shown at the beginning of this story.

Silicone Varnish, Grease Adopted by Truck Company

Silicone varnish and grease were recenty adopted by Automatic Transportation Co., Chicago, as standard high temperature insulating and lubricating materials for motors on the entire 1947 line of fork and platform lift trucks. According to Dow Corning Corp., Midland, Mich., manufacturers of the silicone products, Automatic is the first industrial truck builder to adopt the newly-developed material.

Failure point of silicone varnish in actual use is said never to have been determined. In tests conducted by engineers of the two companies, motors with silicone insulation ran continuously for 5000 hours at temperatures as high as 300° C without damage.

Silicone grease used as a safety overload factor to protect motor bearings against overheating is reported to retain the same consistency—slightly thicker than petrolatum—at temperatures from minus 40 to 350° F.



HIGH PRODUCTION GRINDING: Carrying an 8-sided drum with special cam-actuated clamping fixtures, this semiautomatic grinder is used for high production grinding of loudspeaker motor pots in the St. Charles, Ill. plant of Operadio Mfg. Co. Drum revolves automatically, with operator merely loading parts into fixture. Unloading is by gravity. Manufactured by Gardner Machine Co., Beloit, Wis., machine grinds motor pots to 0.005-in. tolerance on length and 0.002-in. on flatness

A NEW BAR AND TUBE TURNER

✓ . . . automatic centering with roll-type positive, continuous feed

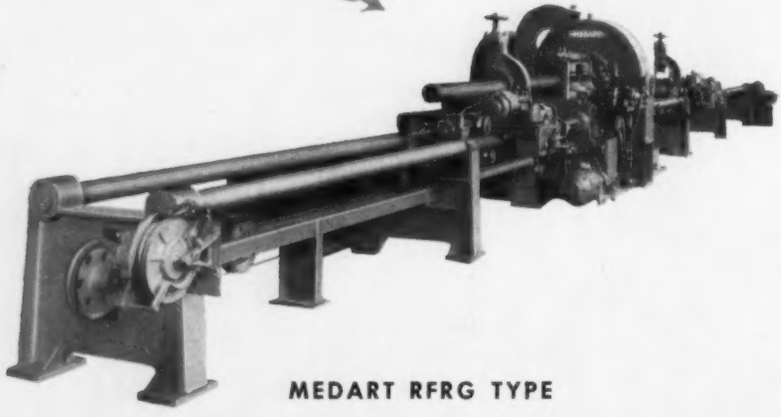
✓ . . . separate drives for cutting tool and bar feed for infinite ratios

✓ . . . two individual automatic-grip carriages

✓ . . . production on rough peel or precision work

✓ . . . 100% chip recovery

The new Medart RFRG type turning machine gives the exact ratio between cutting speed and bar feed rate for superior finish and close tolerance in precision turning, and high production on rough peeling or scalping. Speed and range of materials turned is limited only by the capacity of present day cutting tools. This new machine is completely push-button operated, and its improved, direct drive is actually simpler . . . easier to operate!



MEDART RFRG TYPE

MANUFACTURING ENGINEERS OF COMPLETE TRANSMISSION EQUIPMENT AND SPECIALIZED MACHINERY

MEDART

THE MEDART COMPANY • 3500 DE KALB ST., ST. LOUIS, MO.

Upsetting Technique

(*Concluded from Page* 118)

stem. As the head at the base of the stem enters the rivet shank, it forces the forming of a tulip head at the blind end, as shown in sketch. Pulling action of the gun continues until the stem fractures at a notched point. Expanded section of the stem remains in the rivet shank as a permanent plug and is trimmed flush to the head.

The pull-through hollow type rivet is also upset by a pulling action. But unlike the self-plugging type, its stem is pulled through the entire rivet shank without fracturing, and is then discharged from the gun. This rivet can be plugged with a knurled drive plug which is installed by a few taps with a light mallet.

The company's Monel line includes diameters ranging from 1/8 to 9/32-in., with either brazier or countersunk rivet heads. In addition to Monel, Cherry makes self-plugging, regular, and pull-through hollow rivets in aluminum, steel and brass.

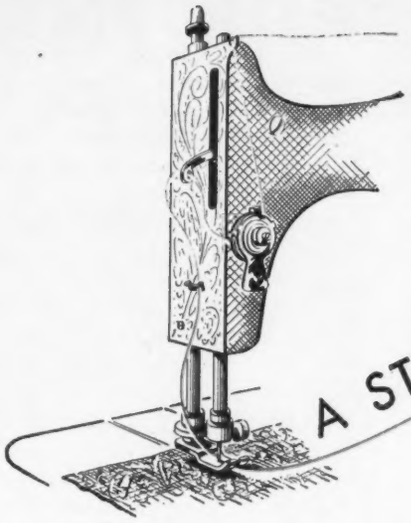
German Miniature Motors Specification Described

Motors as small as 1¼-in. long and ¾-in. in diameter are described in the report containing technical specifications for miniature motors of 2 w and under developed in Germany. Released by Office of Technical Services, Department of Commerce, Washington, the report was prepared by the British Intelligence Objectives Subcommittee and bears the number PB-42770.

The motor consists of a laminated wound stator and an aluminum rotor mounted on a steel shaft running in sapphire bearings. Its outer casing is a die casting with circular laminated iron stampings. A small transmission gear on the end of the rotor shaft projects through the casing. The motor starts on 36 v, 500 cycles and 110 to 135 ma. Once started it requires but 55 to 65 ma at 30 v to operate at 15,000 rpm.

Enameled Steel Utensil Standard Revised

Being circulated to the trade for written acceptance prior to publication by the National Bureau of Standards is a recommended revision, TS-4366, of porcelain enameled steel utensils (second edition), commercial standard CS100-44. Recommended by Enameled Utensil Manufacturers Council, the recommended revision includes requirements for testing of tensils of all shapes and sizes adaptable to the present test methods.



A STITCH IN TIME

CUTS STRIPPING TIME FOR A

Sewing Machine Manufacturer

Recently, a leading manufacturer of sewing machines found a better, faster, more economical way to strip paint from sewing machine parts—thanks to modern Pennsalt methods.

TIME REDUCED TO ONE-SIXTEENTH

Formerly, they had used a caustic potash type of stripper . . . and the job took 24 hours.

The Pennsalt representative recommended and demonstrated a Pennsalt stripper. Result? Complete stripping in only 1½ hours . . . at less than half the previous cleaner cost!

WANT FULL DETAILS ON THIS CASE?

If you'd like to know more about this case, write us for Case Report Number 62-6, which gives complete details. If you have a tough problem in metal cleaning, plating, enamelling or corrosion-resistant construction, turn it over to your Pennsalt representative—by training and experience, he is thoroughly qualified to assist you.

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Oxygen in Steelmaking

(*Continued from Page* 108)

ing the ease of handling and removing the slag.

Steel produced in open hearths supplied with oxygen enriched flames is reported to be normal in metallurgical quality with respect to rimming behavior in molds, cleanliness, physical properties, and aging tendencies to the extent that it has been possible to measure such qualities to date.

Oxygen directed at preheated scrap is a new approach to the problem of reducing the meltdown time in the open hearth, although it has as yet been tried on only a relatively small number of heats. In this method a high velocity oxygen stream is directed through a jet device at preheated scrap. The jet device consists of a central oxygen supply pipe surrounded by two concentric water-cooled passages. The head of the device is equipped with replaceable nozzles. The effect of the oxygen jet is to:

1. Cut down rapidly exposed portions of the scrap, producing a small amount of superheated molten scrap steel.
2. Clear a path for the main burner flame and increase the area of charge exposed to the flame, thereby improving overall heat transfer from the main flame.

In order to start melting scrap with the oxygen jet, sufficient preheating to bring a considerable portion of the scrap charge to the ignition temperature, approximately 2500° F, is performed with the regular end burner operating with or without oxygen. This may require a period of time varying from 20 min to slightly less than an hour. Oxygen is then directed at the preheated scrap through the jet device inserted in the wicket hole of a charging door near the operating end burner as shown in Fig. 4, and is supplied at high velocity (oxygen pressure 75 to 100 psi) and flow rates ranging from 15,000 to 60,000 cfh. Rapid oxidation and melting require frequent adjustment of oxygen jet position for most effective performance. By this method, utilizing the self-sustaining combustion of the scrap to furnish heat, large craters about 7 ft diameter and 3 ft deep can be melted readily in a relatively short time.

Most of the work of directing an oxygen stream onto the preheated scrap has been done with the jet device, although stainless steel or coated steel pipes may be satisfactory for the job. Examples of the jet device are shown in Figs. 2 and 3.

Oxygen and water are supplied to the jet device through 1½-in. rubber hoses. When the jet device is operated through wicket holes, considerable interference with normal shop operation has resulted because the jets with their associated hoses, prevent free movement of charging buggies and charging machines. For this reason, shops finding oxygen-accelerated meltdown advantageous will undoubtedly desire permanent installation of jets in a satisfactory position in the back or the front wall, or possibly through the roof. Development work is in progress on mounting mechanisms for scrap melting with the jet device.

Much higher oxygen utilization efficiencies have been achieved in a few large scale, oxygen-jet melting studies than were secured with similar quantities of oxygen in end burners. Operating on a charge comprising 60 per cent cold scrap, a 25 per cent reduction in charge-to-tap time resulted from injection of about 40 cu ft of oxygen per ton at preheated scrap in a 180-ton open hearth through a jet device at a rate of 30,000 cfh. The merit factor for this operation is well above 50, a value exceeding the best figures for oxygen enrichment through burners by slightly more than 3 times.

Somewhat more complete data are given in Table I. Examination of these data shows that specific oxygen consumptions lie in the range from 22 to 36 cu ft per ton in full scale furnaces. Information shows that an oxygen consumption of 36 cu ft per ton will produce less than 1 per cent of the total furnace heat requirements. Heat produced by scrap oxidation is utilized much more effectively than heat from the main burners, and the removal of scrap from the main burner flame path should increase appreciably the efficiency of heat transferred from the flame during the early portion of the meltdown process.

While data so far developed in connection with oxygen scrap melting justify further work, they are not sufficiently definite for immediate adoption. Experimental work is still being carried out in an endeavor to determine the quantities of oxygen required to produce a desired reduction in heat time, and the optimum injection rates.

Information given here must be regarded as a guide for future work on what may turn into a promising step in furnace operation, rather than a description of an established practice.

Firing oxygen through auxiliary burners is a new method, not previously described in the literature. Highest rate of heat transfer occurs when high intensity, high temperature flames impinge directly on the material to be heated. Therefore, attempts were made to improve the rate of charge melting by using auxiliary burners to furnish stoichiometrically correct oxy-fuel ratio flames, and by directing these flames at the charge.

Six heats were made in the 175-ton furnace equipped with burners installed in the roof. An average saving of approximately 1.6 hours in charge-to-tap time with an oxygen consumption of 200 cu ft per ton was made. The merit factor for this operation is calculated to be in the neighborhood of 5, a value in the upper portion of the range obtained

NEW LITERATURE

BALL BEARINGS
By Dodge Mfg. Corp., Mishawaka, Ind. Buletin A-120 describes the new line of SC ball bearings and gives engineering information covering pillow blocks, hanger bearings, flanged units, take-up units, cylindrical units and steel frame ball bearing take-ups.

CATALOG ON RIVETS
By Champion Rivet Co., Harvard avenue and East 108th street, Cleveland 5. A 48-page booklet containing a complete set of weight tables for both large and small diameter rivets together with head dimensions for all standard rivets.

BETTER STONE CRUSHING
By American Pulverizer Co., 1539 Macklind avenue, St. Louis 10. An 8-page, two-color booklet giving latest data on speeding up and improving of stone crusher output.

HACK SAW BLADES AND BAND SAWS
By G. W. Griffin Co., Franklin, N. H. A 4 x 8½ in. folder listing the hack saw blades and band saws manufactured by the company.

WHEELCO NEWS
By Wheelco Instruments Co., 847 West Harrison street, Chicago 7. An 8-page bulletin giving information pertaining to manufacture of several new lines, redesign of some items, lowering of prices and inauguration of a quick order service.

COMBINATION VISE AND ANGLE PLATE
By Gale Forsen Co., 64 Monmouth street, Springfield 9, Mass. Sheet gives application and specifications of a combination vise and angle plate.

ROTARY GRINDING ATTACHMENT
By Star Gauge Co., Springfield 9, Mass. A 4-page folder illustrating and giving specifications of the rotary grinding attachment for surface grinders.

"JOB-PROVED" PRODUCTS FOR INDUSTRY
By Sun Oil Co., Philadelphia 3. Four-page folder lists and describes company's most important products for industry, is a quick and ready reference of the uses and characteristics of these products.

PREVENTIVE MAINTENANCE WALL CHART
By R. G. LeTourneau Inc., Peoria, Ill. Chart 17 x 22 in. shows at what intervals the Super C Turnapull should be serviced, lists points to be checked or adjusted at each servicing.

SOMETHING NEW! A MILL STOCK of Timken* "Nickel Moly" Tubing

SMALL orders or emergency requirements of Timken "nickel moly" tubing can now be shipped within 24 hours after receipt of your order. A mill stock of this electric furnace, bearing-quality alloy steel tubing is now available in 48 sizes—ranging from 1.389″ to 7.915″ O.D.

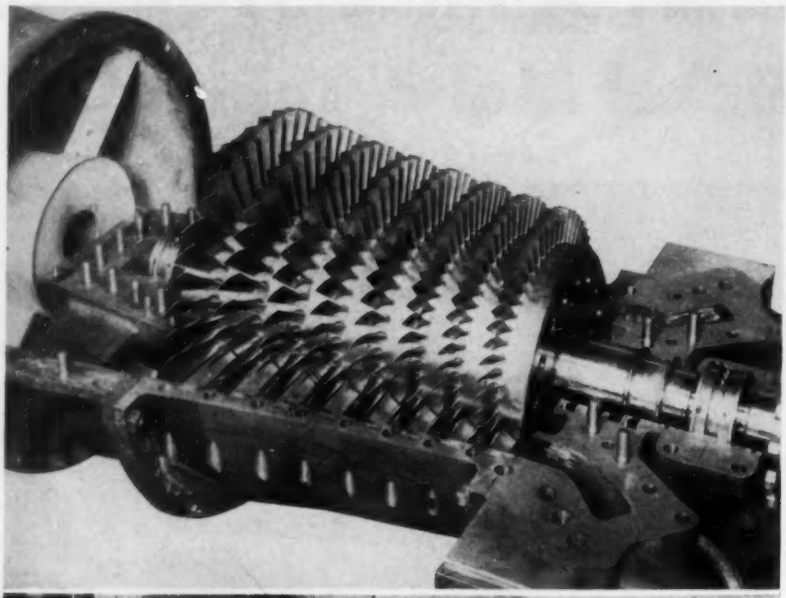
Timken "nickel moly" tubing is made from a fine-grained, carburizing grade steel with excellent machinability. When heat treated, it develops high case hardness and a tough core. Distortion on hardening is exceptionally small.

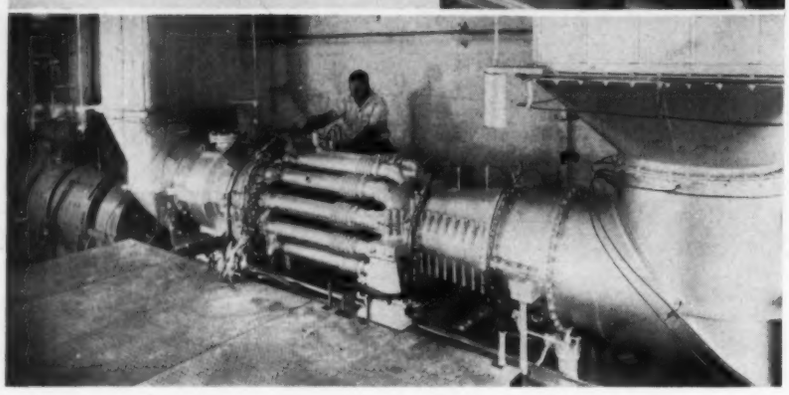
You're sure of getting uniform quality in every lot of Timken "nickel moly" tubing you buy. Every step of its manufacture is completely controlled in our own mills—from melting through final tube inspection.

For highest quality and quickest delivery of "nickel moly" tubing, mail, wire or telephone your orders to Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.





OPEN CYCLE GAS TURBINE: This experimental 2000-hp gas turbine generator (bottom) weighing only 19 lb per horsepower and starting in 1½-min or less was developed recently by Westinghouse Electric Corp., South Philadelphia, Pa., for industrial, central station, marine and locomotive applications. In operation air is taken in by the compressor through an inlet metering nozzle and silencer and compressed to pressures of 30 to 75 psi absolute, depending on the load carried. Fuel oil is mixed with the compressed air and burned in the combustors. Hot gases are expanded through the power-producing turbine and the resultant exhaust gases through a diffuser, elbow, and silencer to the atmosphere.

Blading of the gas turbine (top) is of precision cast cobalt-chromium-tungsten alloy. The rotating blade is tapered and twisted and has a serrated root machine in the base; machining is accomplished with a form grinder which in turn is dressed with a crusher wheel. The stationary blades are also tapered and twisted and have a single T-type fastening machined with a carbide tool. All of the blading is unshrouded and profiled at the tip.

when oxygen is used through end burners.

It was found, however, that the sharp, intense flames produced with the auxiliary burners were too short to be effective when stoichiometric quantities of fuel and oxygen were used. Lower velocity flames from the auxiliary burners were deflected by the oil-air flame from the main burners, so that the auxiliary flame did not impinge upon the scrap, defeating the purpose of oxygen addition. When high velocity auxiliary flames were tested, the end burner flame was deflected, causing pronounced erosion of the refractories.

Installation and operation of auxiliary oxygen burners to accelerate scrap meltdown in large open-hearth furnaces must still be considered an experimental technique. Further development of this method will depend upon design of practical means for mounting and mechanizing burners for roof, backwall, or frontwall operation.

Sufficient work has been performed, however, to show that promising reductions could be effected in charge melting times with auxiliary burner flames. Considerable amounts of fundamental data have been assembled on atomization, flame length-temperature relationships, heat transfer, and general burner performance. This information has been useful also in improving the end burner for the open hearth.

Firing oxygen through the checkers involves no special equipment, but simply enriches the air for combustion with oxygen. Enrichment of the air has been accomplished by the addition of sufficient oxygen to raise the concentration in the air entering the burners from normal to an oxygen content of from 23 to 25 per cent. The oxygen is introduced at a location ahead of the checkers. The air-oxygen mixture is preheated in the customary manner by passage through the checkers.

Advantages claimed for this method by observers in steel mills are:

1. Increased rate of scrap meltdown.
2. Reduction of foam and frothing in the slag.
3. Increased rate of temperature rise just before tapping.
4. More rapid rise in temperature of "quiet" heats where the bath is not agitated sufficiently for satisfactory heat transfer from the normal burner flame.

Improvements in performance are believed to result from increased flame radiation because of higher luminosity, and the ability to increase fuel input to furnace because of rapid combustion.

(*Continued next week*)

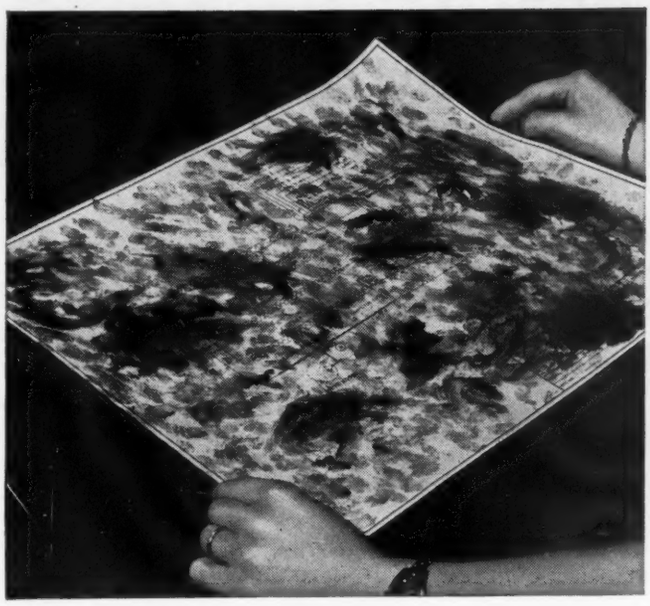
Locomotive Wheel Centers Restored by Arc Welding

Locomotive wheel centers, showing the results of many battering years of service, may be restored to their original diameters many times by arc welding so that standard tires may be fitted to them, states M. J. Conway, welding engineer of General Electric Co., Schenectady, N. Y.

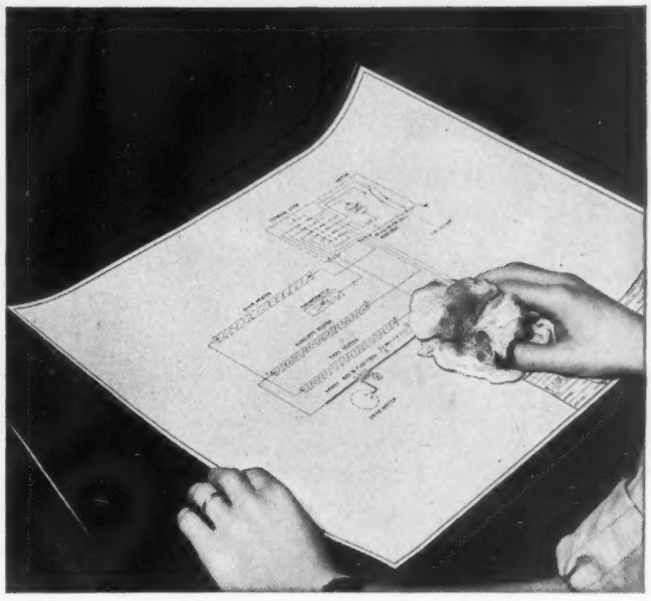
Most economical restoration method is machine welding using automatic heads feeding bare or lightly-coated electrodes. This method has been profitably used by several railroad maintenance shops for a number of years, he states.

Other methods successfully used for this work are also employed. Some wheel centers are built up with deposits made by manual welding with bare or lightly-coated electrodes. Others have steel bands welded to them in order to bring them up to original diameter.

The worst "beating" any print ever took!



Immersed in water for 72 hours! Then oil was poured over it... and, just before this picture was taken, it was smeared with heavy grease!



Here is the same Ozaplastic print seconds later! ... As good as ever, simply cleaned with a damp cloth!

OZAPLASTIC eliminates 95% of your print replacement costs . . . is recommended whenever the going is tough ...where standard paper or cloth prints "fold up" after a short period of service.

You'll want to use Ozaplastic in the shop and field ... around operations where grease, grime, or water abound ...where precision is of the utmost importance ...where annoyances—such as having to wait for a new print—put a hitch in production.

When soiled, you need only rub a damp cloth over Ozaplastic and it's like new—all details sharp and clear, *jet black* on a glossy white background.

For this reason, OZAPLASTIC is also used in sales catalogs and presentation booklets—even laminated on machines, etc., when "on-the-spot" instructions or wiring diagrams are required.

Now . . . Make 16 Types of Ozalid Prints!

OZAPLASTIC is only one of the 16 different types of prints you can produce in an Ozalid machine.

For example, you can reproduce the lines and images of any translucent original in black, blue, red, sepia, or yellow colors. And make prints on white or tinted paper, cloth, foil, film, or plastic.

Thus, you can "color code" prints of different operations . . . and always match the print to the job at hand.

Furthermore, all of these Ozalid prints are made in exactly the same manner—without interruption—in 30 seconds or less.

See the 16 different types of Ozalid prints. Learn how economical it is to make them in the new OZALID STREAMLINER.

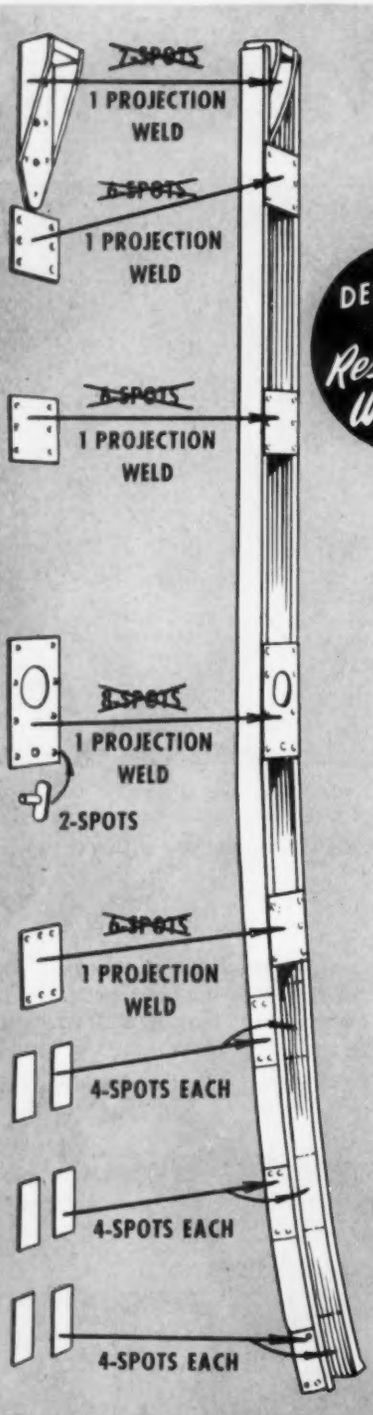
Write today for free booklet No. 280.

OZALID

DIVISION OF GENERAL ANILINE AND FILM CORPORATION

JOHNSON CITY, NEW YORK

Ozalid in Canada—Hughes Owens Co., Ltd., Montreal



Producing 50 bus pillars an hour from these stampings with 59 spot welds was good production. Getting 100 an hour with 5 projection and 26 spot welds was better.

DESIGNED for *Resistance Welding*

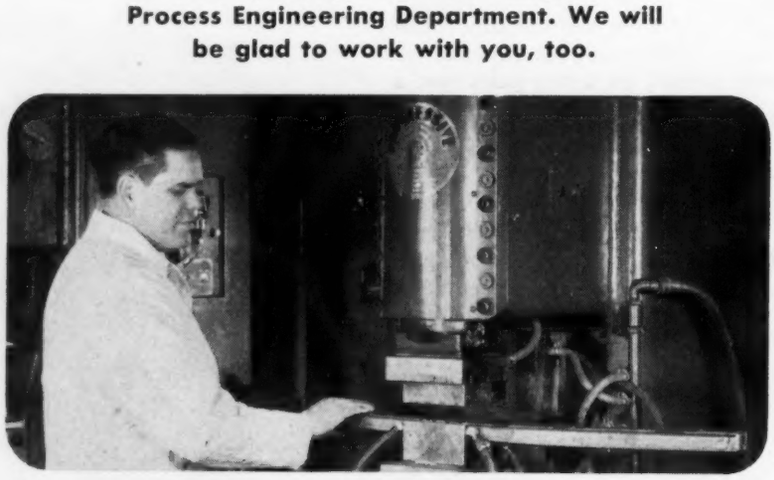
PROGRESSIVE SHOWED THEM HOW TO ... *double production* ... *cut cost in half* by cutting 33 operations to 5

Hawthorne Metal Products Co. of Detroit had a contract to produce reinforced stamped pillars for bus bodies. Their cost was low since they were using spot welding to assemble the 13 separate stampings at 50 an hour.

BUT—after Progressive's Process Engineering Department studied the design and recommended a few minor changes in 5 of the stampings—production jumped to 100 per hour—doubling output per machine hour and cutting assembly cost in half.

Those simple changes made it possible to assemble each of the five largest stampings to the bus pillars proper with just one projection welding operation on each part—five operations instead of 33!!

That's why it pays to call in Progressive's Process Engineering Department. We will be glad to work with you, too.



Here the center bracket is being welded (at eight projections at one time) with a single shot in a Progressive Press Welder.

IT PAYS TO WELD

PROGRESSIVE *Welder Co*

CABLE ADDRESS "PROGWELD"

3050 E. OUTER DRIVE • DETROIT 12

RESISTANCE WELDING EQUIPMENT

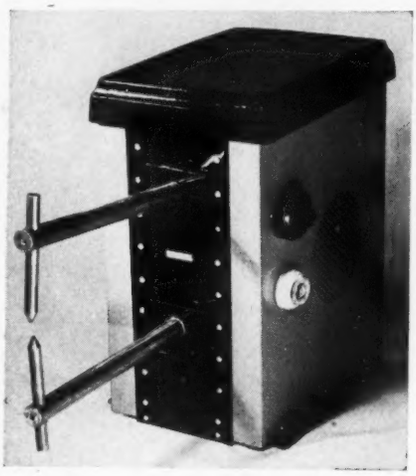
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 152

1. Spot Welder

Equipped with a heavy duty 3-tap switch giving the greatest efficiency on different gages of metal up to and including 18 gage steel, the Volto spot welder, introduced by Curley Electric Mfg. Co., 6104 West Washington boulevard, Culver City, Calif., is designed for operation on 110 or 220 v with an output of 2½ kva.

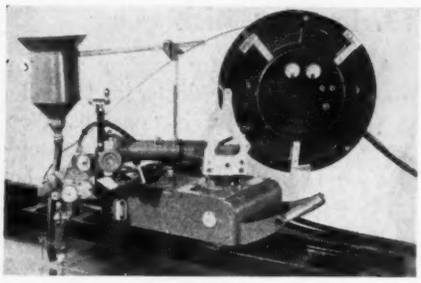
Welder is also equipped with a self-contained safety fuse to guard against



overload in operation. Overall size is 8½ x 12½ x 16 in. (23 in. including arms), It has a 10½-in. throat and weighs 85 lb with hand or foot attachments.

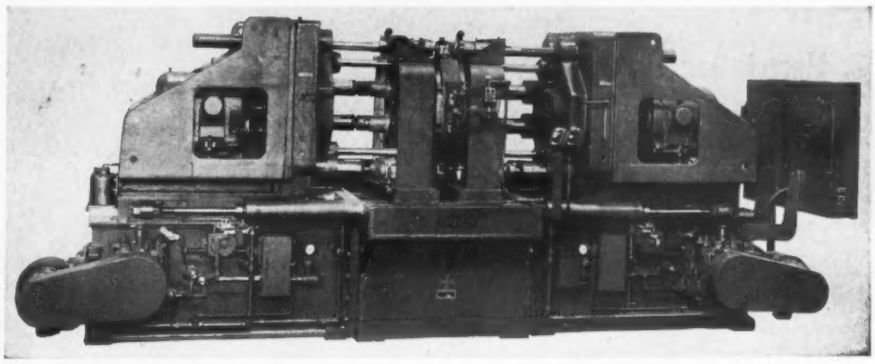
2. Welding Machine

Light-gage sheet and light plate are joined by the Unionmelt process, with the new portable automatic welding machine offered by the Linde Air Products Co., 30 East 42nd street, New York 17. This process consists of welding electri-



cally beneath a layer of granulated mineral composition without visible arc.

Weighing 190 lb, the DS-37 machine may be placed directly on the work and hand-guided, or mounted on standard track or guided by a small structural angle clamped to the work for production welding. Extensions are available for lengthening the nozzle assembly when making nonpositioned fillet welds or welds below the carriage level.



Welding head may be swung forward through 45 degrees, tilted to either side or positioned anywhere in a circle around the carriage. Head and head supporting arm have a 5 in. adjustment. Machine has a stepless speed control from 7 to 210 ipm. It will butt weld, in a single pass, material from 16 gage to ¾-in. thick.

3. Adjustable Saw Track

A structural steel welded track adjustable for use with safety saws W7, W8 and W9 made by Stanley Electric Tool Division of Stanley Works, New Britain, Conn., is offered for square, bevel or bevel mitre cutting lumber 4½ x 17½ in. Track is installed on a work bench and swivels for cutting at an angle.

4. Hand Tachometer

Quick checking of speeds, both clockwise and counter clockwise, of motors shafts, saws, etc., is possible with the hand tachometer announced by AC Spark Plug Division of General Motors Corp., Detroit. It is equipped with two interchangeable rubber tips, one for recessed shafts and pulleys, the other for flat surfaces.

5. Threading Machine

Model 30 HH 2-way opposed floor type unit machine for operations on steering knuckle pin, upper arm support, manufactured by Baker Bros. Inc., Toledo, employs an unusual method of handling, turning and threading on a production basis. Each unit is furnished with a 4-spindle fixed center multiple head for hollow milling and chamfering. Heads are provided with two additional drivers for operating lead screw spindles for external threading, using collapsible die heads.

Both heads are arranged with double motor drive; one for the four spindles and the second with reversing controls for the advance and withdrawal of the lead screw. Machine is furnished with a 4-station hand indexed trunnion fixture. Each station is arranged to accommodate two parts.

6. Lead Tester

Model C electro-mechanical lead tester is the latest development of Pratt & Whitney Division of Niles-Bement-Pond Co., West Hartford, Conn., for checking lead errors of commercial threads on

a large variety of sizes. Workpieces up to 10 in. in diameter and 30 in. long may be held between the tailstock centers. Twenty-six inches of threads may be checked with one setup. Taper and straight threads are checked in the same manner.

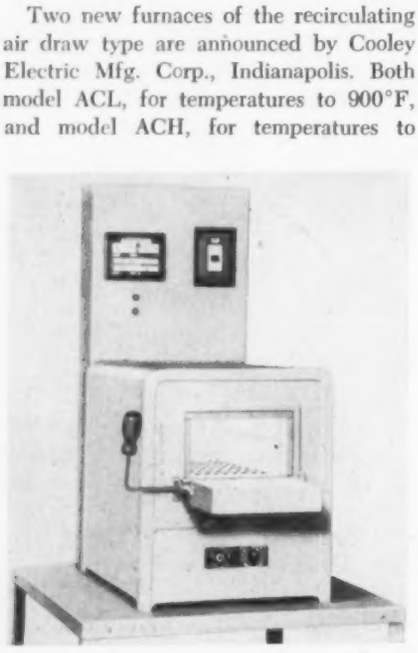
Measuring head of the tester is a P & W Supermicrometer headstock with a 1 in. spindle travel, mounted on a special base. Spindle is graduated in increments of 0.050-in. and dial has 50 graduations of 0.001-in. each with a

vernier which reads directly to 0.0001-in.

Thread locating head is a standard Electrolimit universal circuit head with ball point holder and ball point. Carriage travels on a ball slide parallel with work centers. Cross slide, carrying thread locating head, is spring loaded, giving correct gaging pressure on the ball point when centered in the thread, regardless of work diameter and pitch.

7. Electric Box Furnaces

Two new furnaces of the recirculating air draw type are announced by Cooley Electric Mfg. Corp., Indianapolis. Both model ACL, for temperatures to 900°F, and model ACH, for temperatures to



1200° F, provide the accuracy and uniformity required in all low temperature heat treating operations, such as tempering or drawing of both carbon and high speed steels, nonferrous heat treating, tool and die tempering, etc.

Heating elements are located behind vertical baffles at either side of furnace chamber. An impeller type fan forces air up between the baffles and the heating units, then circulating it down through the work and back to the fan. Input of both furnaces is 4 kw at 230 v. Both have a heavily insulated hinged door. A rigid steel stand and automatic control panel assembly are available.

8. Tap Chuck

Designed for tapping heads and machines, a new small diameter tap chuck, announced by Jacobs Mfg. Co., Hartford, Conn., reduces tap breakage particularly in bottom tapping, and allows higher spindle speeds. Its design includes the company's Rubber-Flex collet which is made up of several hardened steel jaws bonded into a synthetic rubber body.

Cap of chuck is screwed onto the body in the tightening process, the collet being forced into the ground cone until it has a true and rigid grip on the tap shank. Two detachable floating jaws provide a positive drive on the tap square. Adjustment of jaws on the tap square is aided by a large sight hole allowing the operator full view of the tap square when tightening.

Only three chucks are needed to cover a range of taps extending from a No. 0

machine screw to a ⅝-in. hand tap. All models have the standard Jacobs taper hold ground in the back to provide quick attachment to the tapping head spindle.

9. Mine Tractor

A mine tractor of improved design which, when coupled to various types of trailers, hauls coal, supplies or personnel is announced by Baker Industrial Truck Division of Baker-Raulang Co., 2168 West 25th street, Cleveland 13. Tractor has U. S. Bureau of Mines approval and

is designed so that operator may work from either a seated or reclining position, depending upon the height of the seam in which the unit may be operating. Unit operates on rubber tires, running directly on the mine floor.

10. Carbide Tipped Reamers

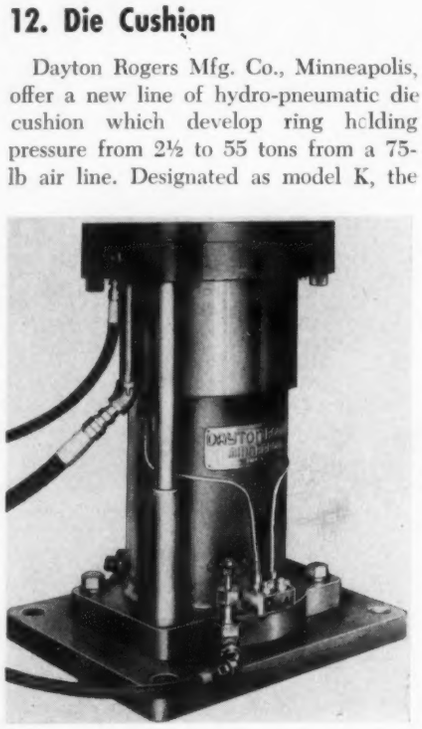
Standardized carbide tipped reamers manufactured by Super Tool Co., 21650 Hoover road, Detroit 13, incorporate tips run the full length of the flutes. They are stocked in 32 sizes ranging from ¼ to 1½-in. The long tips serve as long wearing guides when operated through bushings, and prevent the reamer from freezing up in bushings due to galling.

11. Clamped-In Round Tools

A new line of tools, having clamped-in solid round Kennametal (tungsten carbide) inserts, is announced by Kennametal Inc., Latrobe, Pa. Made for high production, repetitive jobs requiring complex tool setups, tools comprise a solid Kennametal round, clamped on end in a heat treated steel holder and supported by a back-up adjusting screw. Available in both right and left hand styles, inserts may be rotated and reversed to provide new cutting edges.

12. Die Cushion

Dayton Rogers Mfg. Co., Minneapolis, offer a new line of hydro-pneumatic die cushion which develop ring holding pressure from 2½ to 55 tons from a 75-lb air line. Designated as model K, the



cushions made in three sizes, may be used on inclinable or straight side presses, and have deep drawing capacities from 1 to 10 in.

Cushions are designed so that no punch press pit is required. They may be used in multiples of two, three or four on all double crank presses. Each installation is provided with the necessary control valve mechanisms, ready to install, including centralized lubricating system.

13. Dressing Stick

A dressing stick for dressing grinding wheels of 10 in. diameter and smaller is a development of Norton Co., Worcester, Mass. Made of the company's Norbide (boron carbide), the sticks are light and small and have exceptional wearing qualities.

14. Industrial Wheel

Manufactured of tough, light weight aluminum alloy casting with smooth, silent, cut-resistant rubber tread, industrial wheels manufactured by Thermoid Co., Trenton, N. J., have heavy duty ball bearings with built-in grease seals. Wheels have a large grease reservoir equipped with a fitting for maximum lubrication and minimum maintenance.

Sizes of wheels made are 6, 8, 9, 10

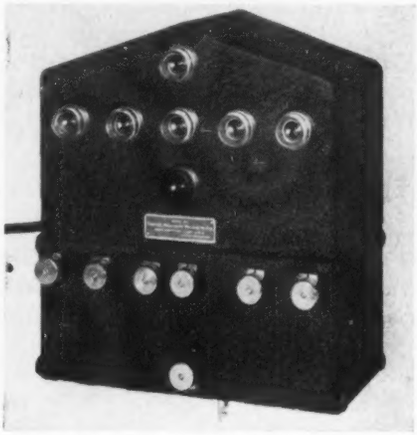
and 12 in. with the approximate load ratings of 480, 640, 750, 900 and 1200 lb, respectively. Tread widths vary from 1⅝ to 2½-in. and hub lengths from 1¾ to 4¼-in; axle sizes from ½ to 1¼-in.

15. Carton Marker

An automatic carton marker for addressing, coding, dating and imprinting contents and quantities on cartons and cases is offered by National Marking Equipment Co., 7 East 48th street, New York 17. Designated as No. 1RC Autoprint, the marker is mounted on conveyor, packing, wrapping or sealing machine. Printing area is approximately 6 x 12 in. It is automatically reset after each carton has passed by.

16. Electronic Gage Head

Self-contained electronic gage head with multiple stations is a development of Yankee Precision Products Co., 50 Bartholomew avenue, Hartford 6, Conn. The instrument, operating directly from



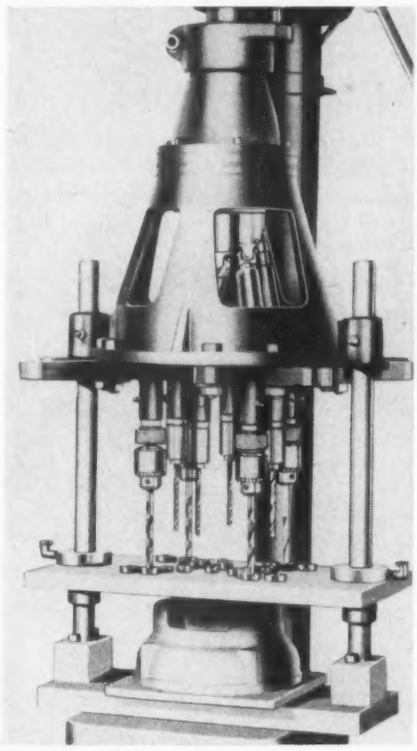
110 v, 60 cycle, single phase current without the use of an electronic control cabinet, is available in combinations up to 14 stations.

Each station is recorded by lights and has its own adjustment for tolerance setting. Accuracy of setting between lights is 0.000005-in. and tolerance range between the low and high limits is 0.015-in. The only moving member, a frictionless gage spindle, operates all lights. Gage head is suitable for selective assembly inspection and for automatic selective gaging units.

17. Multiple Spindle Head

Adjustable spindle work heads which reduce machine investment and floor space are manufactured by International Research Corp., 659 South Anderson street, Los Angeles 23. Heads attach quickly to any standard drill press, and spindles may be adjusted to any desired pattern to suit individual production problems.

Unit illustrated has a subbase with a jig arrangement for machining electric motor parts. Jig plate has 27 bushings. Four spindles have standard drill chucks



and four have collets to allow closer spacing of holes. With this arrangement 10 different parts may be drilled, reamed, spot faced or tapped at different setups with one drill head.

18. Roller Die

Utilization of the Vari-Angle method of engraving has resulted in accuracy and longer life from roller dies. Developed by Acromark Co., 398 Morrell street, Elizabeth, N. J., a new type of roller die, when used in a precision marking machine with a geared control, can mark such accurate items as calibrated pieces, dials, etc. with calibrations as well as numbers and letters.

19. Generator Contactor

A main generator contactor and ground protective relay assembly, designed for aircraft direct current power system

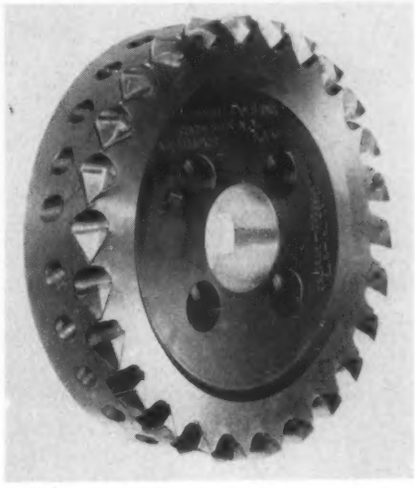
FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 152.

applications is offered by Westinghouse Electric Corp., Pittsburgh 30. Enclosed in a box providing dust, moisture and explosion resistant features, the 3.5 lb unit has bridge type double break contacts, and a special inertial spring arrangement to assure freedom from arcing or freezing contacts. Voltage drop-out prevents operation at below normal system voltages.

20. Face Mills

For the high production of frail malleable or alloyed castings as cylinder blocks, transmission cases, motor frames, pump casings, etc., Weddell Tools Inc., 37 Centennial street, Rochester 11, N. Y., offers its Super Tri-Bit face mill with closely spaced cutter blades. Triangular cutter blade is strong enough to take heavy cuts and clear chips. Due to natural shape of blade there is no heel to catch or clog chips.

A cutting edge wears in the direction of its feed. For roughing cutters this is in line with the chamfered edge and on finishing cutters in line with the lead on the face of the blade. These face mills have cutting blades set into the



body to meet these conditions. Blades are locked in place by a single lock screw. An adjusting screw permits minute adjustment.

Mills are furnished with cutter blades of any cutting material. Roughing cutters are of heavy duty type with ⅞-in. Tri-Bit while finishers use the medium duty ⅝-in. blade.

21. Specific Gravity Tester

Designed for continuous indication of fluid specific gravity in closed piping systems, the specific gravity tester produced by Fischer & Porter Co., Hatboro, Pa., is for use in distillation work and in connection with all process systems in which draining of sample batches is considered tedious or hazardous.

Tester is sturdily constructed to withstand heavy line strain. Brackets, bezels and lighting accessories are available for adapting the device for front or rear panel mounting. Standard construction includes carbon steel, bronze, stainless

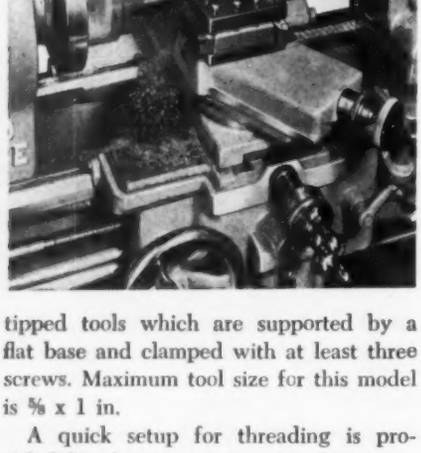
steel or Hastelloy. Needle control valves, thermometers and hydrometers are built into the compact unit.

22. Oxygen Therapy Unit

Self-contained and readily portable, an oxygen therapy unit introduced by Mine Safety Appliances Co., Pittsburgh 8, is designed for oxygen treatments by plant physicians in dispensaries, hospitals or on emergency calls. Provided with a demand type oxygen regulator and reducing valve, the unit supplies a gentle flow of oxygen from any available cylinder through a hose to a flexible face piece. An air mixing valve is also provided.

23. Tool Post Turret

New tool post turret, designed especially for the LeBlond dual drive lathe, is offered by Enco Mfg. Co., Chicago. It provides extreme rigidity for carbide-



tipped tools which are supported by a flat base and clamped with at least three screws. Maximum tool size for this model is ⅝ x 1 in.

A quick setup for threading is provided by the 12 stations, 30 degree indexing. Each tool mounted has three different working positions and may be used for more than one operation. Known as model L-4½, the attachment has an equalizer spring which keeps the tool block and clamping lever in constant contact eliminating chip interference and making indexing quick and easy.

24. Buffing, Polishing Unit

Standard Electrical Tool Co., 2504 River road, Cincinnati 4, is introducing a two-motor proper speed buffing and polishing machine with overhand base construction. Each side of machine is independent of the other, having its own motor, starting equipment, multiple v-belt drive, shaft lock, etc.

Optional equipment is a hand brake for quickly stopping the spindle or the coincidental arrangement of stopping the spindle and shutting off the current. Machine is available in sizes to include 2, 3, 5, 7½, 10, 15 and 20 hp motors. It is also available with Speedial control on each spindle to provide an infinite speed range between 1500 and 3000 rpm.

25. Mechanical Press

Whitley model No. 12 mechanical production press, made by Rodgers Hydraulic Inc., Minneapolis, has a capacity of 1 to 4 tons, its ram or arbor being

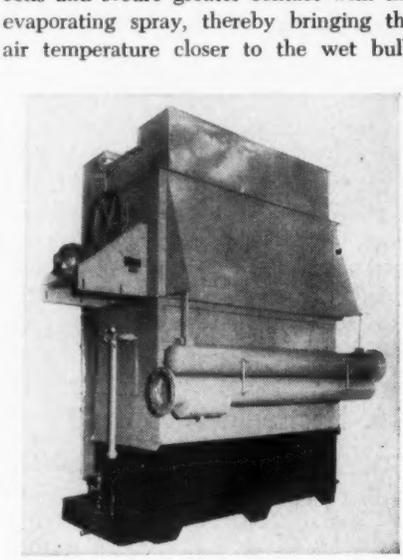
rapidly adjusted to the work by hand, after which pressure is applied by foot. This arrangement leaves the operator's hands free to adjust, hold or measure work. There are six positions between the foot lever and clutch which gives variable pressures.

Press may be used for fast assembly, light riveting and pressing, punching, bending, shaping, marking, etc. Specifications are: Base, 20¾ x 19 in.; height, top of press, 53½-in.; cap height, 12¾ with 7¼-in. reach; distance from floor to work table, 31 in.

26. After Cooler

Announced by Niagara Blower Co., 405 Lexington avenue, New York 17, an Aero after cooler for cooling compressed air and condensing and removing the water vapor contained in it, has greater efficiency because of compressed air coils arranged laterally across the spray chamber. Compressed air is introduced through an oversize manifold located lengthwise on the outside of the casing. It is withdrawn through a similar manifold.

Result of this arrangement is to reduce the friction of the compressed air in the coils and secure greater contact with the evaporating spray, thereby bringing the air temperature closer to the wet bulb



temperatures of the atmospheric air. Since the compressed air temperature reached is always lower than the dry bulb temperature of the ambient air, condensation of water in compressed air lines and tools is prevented.

27. Magnetic Grip Shield

A device for saving eyesight, time and materials is introduced by Dilley Mfg., 1701 Ansel road, Cleveland 6. Consisting of a plexiglas top section fitted to its shatter resistant blue acrylic tray, the unit is equipped with an alnico permanent magnet for instant installation and adjustment to various operating conditions. Device, called the Goldigger, fits over rotating machine spindles.

28. Automotive Finish Wash

Leaving a film free, streakless finish without hand wiping, a new powdered cleaner for truck and automotive finishes, made by Penetone Co., Tenafly, N. J., is soluble in hot, cold, hard, soft or salt water. Called Penesolve No. 20, it requires only a clear water rinse after application. A compound of powerful wetting agents and synthetic detergents, it loosens dirt without harm to the finest finish or painted surface.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Helpful Literature

45. Gas Carburizing

Surface Combustion Corp.—16-page illustrated booklet "Modern Gas Carburizing Processes and Equipment" contains latest data on gas carburizing and related developments of suspended carburization, carbon restoration and dry cyaniding, together with description of various types of controlled atmosphere equipment with which these processes can be accomplished.

46. Portable Spot Welders

Adams Portable Spotwelder—4-page illustrated folder describes spot welder units which feature simplicity of operation and low cost. Outfits consist of gun with pistol-like trigger, dial heat control unit, transformer and timing device. Units are available for operation on either 220 or 440-volt current.

47. Acetylene Generator

Air Reduction Sales Co.—22-page illustrated catalog M & G lists and explains complete line of Airco acetylene generators in stationary models of 300 and 500-pound sizes and portable models in sizes from 15 to 50 pounds. Oxygen manifolds covered include both duplex and simplex types.

48. Flexible Metal Hose

Chicago Metal Hose Corp.—68-page catalog No. G-47 sets forth technical data descriptive of various types of flexible metal hose including Rex-Flex stainless steel hose in both annular and helical corrugated formations. Also described is C.M.H. stainless steel bellows. Chart of relative metal hose values is included.

49. Metal Degreasing

Electrochemicals Dept., E. I. du Pont de Nemours & Co.—10-page illustrated catalog "Metal Degreasing with Chlorinated Solvents" presents information on vapor, vaporspray-vapor, warm liquid-vapor and boiling liquid-warm liquid-vapor methods of degreasing. Installation of equipment, operation and solvent are thoroughly described.

50. Bearings

Adel Precision Products Corp.—4-page illustrated folder No. 601-26 describes Halfco two-piece integrally formed self-aligning bearings. They are normally supplied with bronze race, and standard bearings can be furnished with S.A.E. 1040 steel race. Specification sheet is included.

51. Welding Equipment

Eisler Engineering Co.—36-page illustrated catalog No. 93-W-47 covers spot welding machines and butt welders in range of ¼ to 3 kilovolt-amperes operated manually, by air, or by electronic devices. Covered also are brazing and soldering machines, welding timers and contactors, numerous welding tips and fixtures, accessories, and examples of large spot welders and transformers.

52. Tube Mills

American Electric Fusion Corp.—12-page illustrated catalog "Tube Mill" describes line of A.E.F. tube mills designed to convert strip steel into electrically welded tubing. Machines automatically form, weld, straighten, size and cut tubing.

53. Pneumatic Equipment

Bellows Co.—16-page illustrated bulletin No. CL-10 deals with Controlled Air lines of air motors, vises, feeds, Hydro-Check hydraulic resistance units, and air cylinders for production operations. Typical operations are listed and specifications given.

54. Nickel Steel Tubing

Babcock & Wilcox Tube Co.—10-page illustrated bulletin No. TR-508 deals with 9-per cent nickel tubing now available. Mechanical and working characteristics, heat treating behavior and weldability are covered.

55. Compressed Air Cleaners

Logan Engineering Co.—Illustrated bulletin No. 147 points out construction features and installations of Aridifier unit for removing contamination from compressed air lines. Tables, charts and drawings show how to select and install unit to meet specific requirements.

56. Oil Strainers

Bell & Gossett Co.—4-page illustrated folder No. KS-942 describes advantages, applications and operation of Kleen-Well line of oil strainers for quench oil cooling systems. Strainers are available with capacities ranging from 10 to 500 gallons per minute in screens of from 60 mesh to ⅛-inch hole perforated metal.

57. Fastening Devices

Chicago Rivet & Machine Co.—48-page loose leaf catalog presents information on semitubular, deep drilled, split and special rivets; automatic setting machines; and variety of horns and anvil holders. Specifications and operating data are given on more than 24 different models of machines.

58. Rotary Vacuum Pump

William Reid Co.—Illustrated card gives operating data and features of rotary vacuum pump with rating of 28 inches vacuum at 850 revolutions per minute.

59. Bar Feed Attachment

Hy-Level Screw Products Co.—4-page illustrated folder No. 75 describes liquid pressure bar feed attachment which minimizes noise, reduces amount of material waste and reduces production time. Diagrams and operation data are presented.

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60. Welding

Spotweld, Inc.—4-page illustrated folder No. 100 describes facilities for spotwelding aluminum and other nonferrous alloys, stainless steel and mild steels; seamwelding and projection welding to specifications.

61. Structural Steel

Inland Steel Co.—16-page illustrated engineering bulletin No. 11 contains data on Hi-Steel low alloy, high strength, structural steel. Chemical analysis, properties, corrosion and abrasion resistance, cost, workability and advantages of metal are discussed.

62. Grinding Wheels

Norton Co.—32-page illustrated booklet "Norton Grinding Wheels" shows and lists prices of grinding wheels for use in foundries, steel mills, and forge and welding shops. Suggested specifications are given on wheels for specific operations.

63. Flexible Shaft Equipment

Wyzenbeek & Staff, Inc.—32-page illustrated catalog on complete line of flexible shaft equipment includes new machines such as Wycomatic Speed Changer variable speed flexible shaft machine and Streamflex cabinet enclosed safety models. Recommendations are made as to proper models and types of shafts for various kinds of work.

64. Strengthened Metal

Rigid-Tex Corp.—Illustrated bulletin "Rigidized Metals" discusses strengthening and texturizing process that is applicable to both ferrous and nonferrous sheet and strip. Metals processed provide scuff resistant texture which permits weight and cost savings through utilization of lighter gage metal than otherwise required.

65. Diamond Tools

Diamond Products, Inc.—12-page illustrated bulletin "Diamonds for Industry" presents information on single stone diamond, cone point, chisel edge, thread grinder, Tandem type, Tri-set, Unispace and Multilayer dressers; shaped diamond tools; and diamond impregnated center grinding cones.

66. Baling Presses

Dempster Bros., Inc.—6-page illustrated bulletin "The Dempster Balester" describes models No. 125 and 275 hydraulic baling presses for scrap metals. Specifications and general descriptions are included. Model 125 handles approximately 1 ton per hour and model 275 handles 3 tons per hour.

67. Condensing Units

Jack & Heintz Precision Industries, Inc.—12-page illustrated manual RCU 5000 contains data on refrigeration condensing units, installation hints, refrigeration tables and parts price list.

68. Spectrometers

Gaertner Scientific Corp.—22-page illustrated bulletin No. 157-74 deals with industrial and educational applications of the spectrometer. Models L100, L102, L111, L112, L123 and L124 are described and proper selection of unit according to needs is covered.

69. Carbide Tipped Tools

Super Tool Co.—40-page illustrated catalog No. 47-A lists prices and specifications for carbide tipped tool bits; reamers; centers; milling cutters; saws; counterbores; and core, straight flute, masonry, glass, and twist drills. Engineering data covering tool bits and milling cutters are presented.

70. Welders & Brazers

Banner Products Co.—4-page illustrated bulletin No. G1-47 depicts and describes air and foot operated spot and butt welders, brazers, portable gun and portable brazer.

71. Metal Finishing

Metal Finishing Div., Pyrene Mfg. Co. —4-page illustrated folder "You Can Get Them All at Pyrene" lists diversified metal finishes available on either job or contract basis. Processes include Alumilite, plating on aluminum, Bonderite, cadmium plating, copper, chromium and hard chromium plating, Cronak, enameling, Iridite, lacquering, Pyrene bright nickel, Parkerizing, polishing and many others.

72. Conveyors

Trowbridge Conveyor Co.—8-page illustrated catalog No. 755 describes portable flat belt conveyors for coal, coke and other nonabrasive materials; portable trough belt conveyors for sand, gravel, cinders and other abrasive materials; general freight portable conveyors and special conveyors in both portable and stationary models.

73. Resistance Welding Machines

Weldex, Inc.—10-page illustrated catalog describes line of bench and floor model light gage resistance welding machines ranging in capacity from 1 to 7½ kilovolt-amperes. Applications including several unusual examples of projection and spot welding are illustrated.

74. Lighting Practices

Fostoria Pressed Steel Corp.—12-page illustrated vest-pocket size booklet "Balanced Lighting—What It Is. . .Why You Need It" presents analysis and solution to many seeing needs found in factories and offices. Proper layouts and placement of lighting fixtures are discussed.

75. Tin Bronze & Brass Welding

Ampco Metal, Inc.—Welding procedure sheets "Ampco Procedure for Welding Tin Bronzes" and "Ampco Welding Procedure for Brass" cover use of Ampco bronze welding electrodes in joining and overlaying these alloys.

FOR MORE INFORMATION USE ONE OF THESE CARDS . . .

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Steel Prices Under Pressure As Basic Materials Advance

Rise in scrap, coke and tungsten exert added force on finished steel price structure. Increase expected on pig iron. Freight rate boost to raise delivered prices on small-lot steel purchases. Steel producers preparing for July coal strike

INFLATIONARY forces are pressing with renewed vigor for release in the steel and related markets. With demand taxing mill production facilities to the limit, a new show of price strength in basic steelmaking materials, such as scrap, coke and pig iron, is lending an added push to the upward pressure on the finished steel price structure.

Last week scrap continued to display renewed strength, advancing sharply in the East and at Chicago. At the same time broad increases appeared in the making on pig iron (possibly within the next 30 to 60 days), while beehive coke prices advanced in a buoyant market and tungsten ore was quoted several dollars per ton above recent price levels.

Underlying the strong tone in most basic commodities is the prospect of higher fuel prices in event the coal miners win another wage increase, now being negotiated.

Scrap is moving in somewhat better volume though mill purchases continue restricted. However, buying is picking up as steelmakers, anticipating a coal strike in July, with accompanying curtailment in blast furnace operation, prepare to increase scrap charges in openhearths as an offset to shortened pig iron supply. Since scrap stocks are not large a spurt in buying could push prices quickly to the high levels of last March.

Several factors are contributing strength in pig iron. Not only are higher fuel costs in prospect, but government subsidies on foundry iron, set up months ago to stimulate production for housing, are scheduled to expire at the end of June. Producers are expected to advance prices to make up for the difference in costs. Higher scrap prices also are likely to exert a bullish force in the pig iron market, while demand shows every sign of continuing to tax furnace capacity for months to come. Indicative of the strength in this market is an increase of $2 per ton on high silicon silvery iron effected by a leading producing interest last week.

An advance of $4 to $5 per ton on tungsten ore is expected to force tool steel prices higher. As a matter of fact, one producer of high-speed cutting tools is reported to have increased prices 10 per cent.

To what extent, and how soon, the strength in basic materials will be communicated to finished steel products, of course, is uncertain. That producers cannot hold to established price lists in the face of a broad upswing in basic commodities, however, is generally agreed, and market observers think only a sharp contraction in demand will keep prices from rising. At this juncture such does not appear in the cards.

Illustrative of the forces working toward higher prices is the fact less-carlot freight rates in Official Classification Territory are scheduled to advance June 20. This will result in higher delivered prices to the thousands of small-lot steel buyers serviced by jobbers. Incidentally, warehouses at one leading distributing center last week raised cutting extras to offset increased labor costs. In still another direction on the market front, a recent increase in bolt and nut prices in the East last week spread to the Midwest where producers announced a change in lists.

Steelmaking operations held unchanged last week at 96.5 per cent of capacity. Declines of 1 point at Pittsburgh to 101.5 per cent and at Detroit to 88 per cent were offset by advances of 2½ points in St. Louis to 84.5 per cent, of 1 point in Cleveland to 92.5 per cent and ½ point in Chicago to 95.5 per cent.

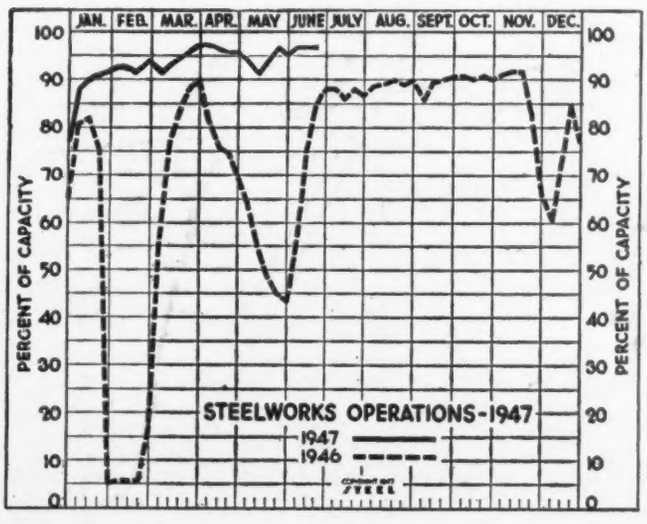
STEEL's composite price average for steelmaking scrap advanced for the fourth successive week to $33.50. Other composites held steady at $69.82 for finished steel, $52.10 for semifinished steel and $32.49 for steelmaking pig iron.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 21	Change	Same Week 1946	Same Week 1945
Pittsburgh	101.5	− 1	86	89
Chicago	95.5	+ 0.5	85	95.5
Eastern Pa.	93	None	86	90
Youngstown	93	None	78	90
Wheeling	89	None	80.5	90.5
Cleveland	92.5	+ 1	88	91.5
Buffalo	88.5	None	86	90.5
Birmingham	99	None	95	65
New England	92	None	80	86
Cincinnati	85	None	91	55
St. Louis	84.5	+ 2.5	54.5	75
Detroit	88	− 1	90	75
Estimated national rate	96.5	None	85	90

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.



COMPOSITE MARKET AVERAGES

	June 21	June 14	June 7	One Month Ago May, 1947	Three Months Ago Mar., 1947	One Year Ago June, 1946	Five Years Ago June, 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.82	$64.09	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	52.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	32.49	32.40	27.50	23.00
Steelmaking Scrap	33..50	31.25	30.08	29.75	37.25	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	June 21, 1947	May, 1947	Mar., 1947	June, 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.82
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.50	2.35
Shapes, Philadelphia	2.64	2.64	2.64	2.465
Shapes, Chicago	2.50	2.50	2.50	2.35
Plates, Pittsburgh	2.65	2.65	2.65	2.50
Plates, Philadelphia	2.85	2.85	2.85	2.55
Plates, Chicago	2.65	2.65	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.50	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.125	3.50
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	42.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	42.00	39.00
Wire rods $\frac{5}{16}$ to $\frac{1}{4}$-inch, Pitts.	2.55c	2.55c	2.55c	‡2.30c

‡ Base, No. 5 to $\frac{5}{16}$-in.

Pig Iron

	June 21, 1947	May, 1947	Mar., 1947	June, 1946
Bessemer, del., Pittsburgh	$34.83	$34.83	$34.83	$29.69
Basic, Valley	33.00	33.00	33.00	28.00
Basic, eastern del. Philadelphia	35.52	35.52	34.26	27.84
No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33	34.33	29.19
No. 2 fdry., del. Philadelphia	36.02	36.02	34.76	28.34
No. 2 foundry, Chicago	33.00	33.00	33.00	28.50
Southern No. 2 Birmingham	29.88	29.88	29.28	22.88
Southern No. 2, del. Cincinnati	34.75	34.75	34.15	26.94
Malleable, Valley	33.50	33.50	33.50	28.50
Malleable, Chicago	33.50	33.50	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	40.50	40.50	40.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	33.66	28.55
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$32.50	$30.00	$37.25	$20.00
Heavy melt. steel, No. 2, E. Pa.	36.75	28.35	38 50	18.75
Heavy melt. Steel, Chicago	31.25	29.25	35.125	18.75
Rails for rerolling, Chicago	36.50	34.50	40.75	22.25
No. 1 cast, Chicago	39 00	36.90	43.25	20.00

Coke

Connellsville, furnace ovens	$10.00	$9.125	$8.875	$8.75
Connellsville, foundry ovens	10.875	10.375	10.375	9.50
Chicago, by-product fdry., del.	16.10	16.10	16.10	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown. **Alloy Steel Ingots:** Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, $\frac{5}{16}$ to $\frac{1}{4}$-in., inclusive $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c; San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co., quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10; (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10; (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, base, 3.65

Culvert Sheets, No. 16 flat; (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets, No. 20: Hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45c; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)
Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del. 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)
Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; over 0.80 to 1.00, 6.80c; over 1.00, 9.10c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.
Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)
Floor Plates: Pittsburgh, Chicago, 3.90c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.
Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)
Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads	
Bright, basic or bessemer	*$3.30–$3.55
Spring (except Birmingham)	**$4.25
Wire Products to Trade	
Nails and Staples	
Standard and cement-coated	†$3.75–$4.50
Galvanized	‡$3.75–$4.50
Wire, Merchant Quality	
Annealed (6 to 8 base)	§$3.95
Galvanized (6 to 8 base)	§$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)	
Woven fence, 15 gage and heavier	††84
Barbed wire, 80-rod spool	††94
Barbless wire, twisted	94
Fence posts (no clamps)	††90
Bale ties, single loop	††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.
** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.
† Worcester $4.05, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.
†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), Williamsport, Pa., $3.20, Pittsburgh, 2.85. Relaying, 60 lb and over fob warehouse $45-$47 per net ton.
Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	½	— 2	+20
¼ & ⅜	51	30½	¾	—11½	+10
½	55½	41	1-1¼	—17	+ 2
¾	58½	45	1½	—22½	— 1½
1-3	60½	47½	2	—23	— 2

Lap Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	— 7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	—21	— 4
*12	56½	41	4½-8	—19	— 2½
			9-12	—10	+ 7

* Not T. & C.

Seamless
Steel

In.	Blk.	Gal	In.	Blk.	Gal
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	48 off
⅝ and ¾ x 6-in. and shorter	50 off
Larger diameter; longer than 6 in.	47 off
Tire bolts	38 off
Step bolts	46 off
Plow bolts	57 off
Lag bolts	
¼ in. up to 1 in., 6 in. and shorter	50 off
¼ in. up to 1 in., longer than 6 in.	48 off

Stove Bolts
In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	51 off	....
½-in. and smaller	....	50 off
½-in.-1-in.	48 off	....
⅝-in.-1-in.	....	49 off
1⅛-in.-1½-in.	46 off	47 off
1⅝-in. and larger	....	40 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright)	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ¼-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
½-in. and under	55-5 off
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per bbl; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

PIG IRON

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa.,** base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	35.00	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base)	$42.50		
6.51-7.00	$43.50	9.01- 9.50	48.50
7.01-7.50	44.50	9.51-10.00	49.50
7.51-8.00	45.50	10.01-10.50	50.50
8.01-8.50	46.50	10.51-11.00	51.50
8.51-9.00	47.50	11.01-11.50	52.50

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $65.75, Jackson, O.; 667, Niagara Falls; $68, piglets, $66, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$9.50–$10.50
Connellsville, foundry	9.75–12.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

* Operators of hand-drawn ovens using trucked coal, $10.10-$11.10.

Foundry Coke

Kearney, N. J., ovens	$15.35
Chicago, outside del.	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, Del.	13.25
Indianapolis, ovens	14.50
Cincinnati, del.	15.35
Ironton, O., ovens	13.35
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	14.50
Portsmouth, O., ovens	14.00
Fairmont, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coal Chemicals

Spot, gal, freight allowed east of Omaha. Effective as of Apr. 1, 1947

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	76.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50–6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$30–$31

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.85	3.85	3.85	3.85	3.85	3.85	...	...	...
Cold-Rolled	4.75	4.75	4.75	4.75	...	4.75	...	...	...
Galvanized	5.40	...	...	...	...	.....	...	...	...
Strip, Hot-Rolled	3.85	3.85	3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½"& up	H-R Alloy (‡4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (City)	4.50	5.67[4]	5.22[4]	5.55[4]	6.80[4]	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42
††New York (city)	4.42	....	5.27[8]	5.47[8]	....	4.62	....	4.62	5.17	8.42[13]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[8]	5.37[8]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.34	5.73[9]	5.33[9]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.13	6.87	4.22	4.44	5.93
Philadelphia (country)	4.24	5.63[9]	5.23[9]	5.19[5]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.34	5.83
Baltimore (city)	4.09	6.15[5]	5.65[5]	5.14[5]	6.39[5]	4.40	....	4.45	5.10	....	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[5]	5.55[5]	....	....	....	....	....	....	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35					....	....	4.75	5.50	....	4.50	4.50	6.25
Buffalo (city)	4.05	....	4.75[5]	5.35[5]	....	4.30	5.25	4.10	4.75	....	4.10	4.65	5.90
Buffalo (country)	3.90	....	4.60[5]	4.95[5]	....	3.90	4.85	3.95	4.60	6.60	3.93	4.20	5.45
Pittsburgh (city)	3.95†	....	4.75[5]†	5.10[5]	6.35[5]	4.05	5.00	4.10	4.75	6.60	4.10	4.25	5.60
Pittsburgh (country)	3.80†	....	4.60[5]†	4.95[5]	6.20[5]	3.90	4.85	3.95	4.60	6.60	3.95	4.10	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.05	5.30	4.85‡	5.42	6.67	4.34	5.24	4.20	4.87[13]	7.01	4.42	4.49	5.92
Cleveland (city)	4.15	5.15[5]	4.85[5]	5.238[5]	6.488[5]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	4.00	5.00[5]	4.70[5]	....	....	3.90	4.95	3.95	4.60	....	....	4.10	....
Cincinnati	4.016	4.816[5]	....	5.166[5]	6.416[5]	4.394	....	4.403	5.053	....	4.444	4.553	5.944
Chicago (city)	4.15	5.15[5]	4.85[5]	5.10[5]	6.35[5]	4.05	5.10	4.10	4.75	6.60[13]	4.10	4.25	5.75
Chicago (country)	4.00	5.00[5]	4.70[5]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.60	6.60[13]	3.95	4.10	5.60
Milwaukee	4.299	5.299[5]	4.999[5]	5.249[5]	6.499[5]	4.199	5.249	4.249	4.899	6.899	4.249	4.399	5.899
St. Paul, Minneapolis	4.284[13]	....	5.084[5]†	5.434[5]	6.684[5]	4.384[12]	....	4.434[13]	5.476[11]	7.084[11]	4.434[13]	4.584[13]	6.084[13]
Indianapolis	4.04	....	4.84[5]	5.29[5]	6.54[5]	4.24	....	4.36‡‡	5.26	....	4.36	4.61	6.01
St. Louis	4.699	....	4.899[9]†	5.424[5]	6.674[5]	4.199	....	4.249	5.074[12]	7.074	4.249	3.999	5.899
Birmingham (city)	3.85[20]	....	....	5.20[5]	....	4.10[20]	....	4.05[20]	5.58	....	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[5]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.68[20]**	....	5.94[5]	....	....	4.88[20]	....	4.83[20]**	5.94[13]		4.73[20]**	5.03[20]	6.99[20]
Houston, Tex.	6.00[1]	....	....	6.00	....	6.00[1]	....	5.35[1]	....	6.35	5.85	5.85	6.40
Omaha, Nebr.	4.868	6.118[5]	....	5.918[5]	7.168[5]	4.862	....	4.918	5.818[11]	....	4.918	5.068	6.568
Los Angeles	5.35	....	7.00[5]	....	7.45[5]	5.65	8.35	5.10	6.90[19]	9.35	5.20	5.10	7.20
San Francisco	4.90[21]	....	6.30[5]	....	7.35[5]	5.20[14]	8.35[14]	4.75[14]	***	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Seattle and Tacoma, Wash.	5.00[17]	....	6.75[5]	6.30[5]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[13]	4.95[17]	5.15[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds; [21]—400 lb and over.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; ** add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; *** rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44, Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie-Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.27; contract, $2.25; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots. **S. M. Ferrochrome, high carbon:** (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.90, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Activity in Nonferrous Metals Declines

Inquiry tapers as metal-working firms prepare to close plants for vacations . . . Silver price drops

NEW YORK — Activity in major nonferrous metal markets declined last week, indicating that seasonal influences are having their normal effect on trading. Many plants will shut down for vacation periods this year, rather than operate on a curtailed basis.

Pricewise, the market was featured by a drop in silver prices to 68.37½c, the lowest level since September, 1945.

COPPER — Mine producers booked moderate tonnages on the basis of 21.50c, Connecticut Valley, for elecrolytic but custom smelters did very little business since they already have booked practically all of their July metal and have not opened August books officially.

Crude copper output continued at a high rate in May, amounting to 76,592 tons, while output from secondary sources amounted to 13,964 tons, making total output 90,556 tons. This was the largest production reported since May, 1944, when it was 94,534 tons.

Refined copper output increased to a new all-time high of 110,670 tons, a gain of 3400 tons over the April total.

Deliveries of copper to consumers increased 2500 tons in May to 122,868 tons. Of this total, 11,195 tons were shipped consumers by the Office of Metals Reserve, or about one-half the quantity moved by that government agency in April.

Stocks of copper at refineries, which now include foreign as well as domestic refined metal, amounted to 77,716 tons, or a drop of 3927 tons from the April total.

LEAD — Producers continue to book their daily quotas easily and now are committed for slightly over 50 per cent of the supplies that will be available for shipment in July. Undertone of the market remains steady at 14.80c to 14.85c, St. Louis, for the common grade.

ZINC — British Ministry of Supply recently purchased 2000 tons of Mexican zinc of prime western quality at a price equivalent to about 10.12½c, fas Gulf ports, or about ⅜-cent under the domestic quotation. Some market interests believe the tonnage actually booked may reach 10,000 tons for delivery during the last six months of this year. Domestic demand for prime western continues to hold at a satisfactory rate, but inquiry for other grades has declined during recent weeks. Zinc rollers have reported a falling off in demand from the building trades.

TIN — Congress is expected to pass a bill soon to extend government authority to operate the Longhorn tin smelter at Texas City, Tex., to June 30, 1949. In a policy preamble, the bill states that tin is now and "for the immediate future" will remain in short supply. It recommends a study by Congress of the advisability of maintaining a permanent domestic tin smelting industry and a survey to determine the amount of tin needed to meet industrial and military demands.

The measure specifically authorizes the government to: Buy, sell and transport tin and tin ore concentrates; improve, maintain and operate the Texas City smelter; finance research in tin smelting and processing; and to do all other things necessary for accomplishment of the foregoing.

Officials of Patino Mines & Enterprises Consolidated threaten to close their mines "if the Bolivian government insists on interfering with the company's legal rights." At least one mine and one plant of the Hochschild group have been closed due to difficulties with workers, high wages and other reasons. Exports of tin concentrates from Bolivia in April totaled about 3450 tons of contained tin, making the total for the first four months only 9187 tons, or a decline of 24 per cent from the 1946 rate.

Labor difficulties also have curtailed production in the Netherlands East Indies where output dropped to only 997 tons in May from 1525 tons in April. However, output in NEI should increase in July because one of the large American-built dredges will then start operating at Banka and one of the Holland-built dredges will start operating at Billiton. Two other dredges are on the way and two more will start out when the danger of encountering the monsoon is over.

Reconstrution Finance Corp. has purchased another 750 tons of Straits tin to apply against the allocation of 9326 tons of pig tin granted the United States by the Combined Tin Committee for the first half of 1947. This makes 3000 tons of Straits tin booked for shipment to this country so far this year.

SILVER — Silver market here weakened last week due to a drop in demand from domestic as well as foreign buyers. Handy & Harman reduced their "official" price to 68.37½c an ounce, the lowest level reached since Sept. 21, 1945. At that itme, the price of foreign silver was increased by government order from the wartime ceiling level of 44.75c to 70.75c an ounce.

The drop in domestic demand is attributed to the approach of silverware manufacturing plant shutdowns for annual vacation periods. Manufacturers do not want to build up inventories to carry over the summer months. Lack of dollar exchanges has reduced the volume of inquiries from foreign interests.

NONFERROUS ALLOYS — Nearly 140,000 pounds of essential nonferrous metals, including brass bars, bronze copper, bronze aluminum, silver solder coils, copper wire, and other alloys will be placed on sale through listings in catalogue CG-93-1192, Chicago regional director of War Assets Administration has announced. The material offered through a sealed bid sale starting June 27 and closing July 16, cost the government more than $62,000. The sale will follow the regular order of priorities.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.50c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 23.50c; No. 1 yellow (No. 405) 15.75c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 13.00c; grade 3 (90-92%) 12.25c; grade 4 (85-90%) 11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $84-$87 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 69.37½c, per ounce.

Platinum: $56-$59 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.44c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb. 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb 45.50c; 1000 to 1999, 46.50c; 600 to 9999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carlcad lots)

No. 1 copper 15.50, No. 2 copper 14.00, light copper 13.50, composition red brass 13.25, auto radiators 10.00, heavy yellow brass 9.00, brass pipe 9.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 17.00; No. 2 copper, 15.50, light copper, 14.50; refinery brass (60% copper), per dry copper content less 85 smelting charge for brass analyzing 60 per cent or more, 13.62½.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 15.50-16.00, No. 2 14.50-15.00, light copper 13.00-13.50; No. 1 composition turnings 10.00-10.50, mixed brass turnings 6.50-7.00, new brass clippings 12.00-12.50, No. 1 brass rod turnings 10.50-11.00, light brass 5.00-5.50, heavy yellow brass 7.00-7.50, new brass rod ends 11.00-11.50, auto radiators, unsweated 9.00-9.25, cocks and faucets 9.25-9.50, brass pipe 8.75-9.00.

Lead: Heavy lead 11.50-12.00, battery plates 6.25-6.75, linotype and stereotype 12.75-13.25, electrotype 10.75-11.25, mixed babbitt 12.00-13.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00-5.50, new die cast scrap 4.00-4.50, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 8.00-8.50, old sheets 5.00-5.50, crankcase 4.00-4.50, borings and turnings 2.00, pistons, free of struts, 4.00-4.50.

Nickel: Anodes 18.50-19.00, turnings 15.50-16.50, rod ends 18.00-19.00.

Monel: Clippings 13.00-14.00, turnings 7.50-8.00, old sheet 11.00-12.00, rods 11.50-12.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$32.50
No. 2 Heavy Melt. Steel	32.50
No. 1 Busheling	32.50
Nos. 1, 2 & 3 Bundles	32.50
Machine Shop Turnings	27.50-28.00
Mixed Borings, Turnings	27.50-28.00
Short Shovel Turnings	29.50-30.00
Cast Iron Borings	28.50-29.00
Bar Crops and Plate	39 00-40.00
Low Phos. Cast Steel	39.00-40.00
Punchings & Plate Scrap	39.00-40.00
Cut Structurals	39.00-40.00
Elec. Furnace Bundles	39.00-40.00
Heavy Turnings	31.00-31.50
No. 1 Chemical Borings	31.00-32.00

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	35.00-35.50
Heavy Breakable Cast	34.00-34.50
Stove Plate	37 50-38.00
Unstripped Motor Blocks	37.50-38.00
Malleable	44.50-45.00
Brake Shoes	35.00-36.00
Clean Auto Cast	40.00-41.00
No. 1 Wheels	42.00-42.50
Burnt Cast	35.00-36.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	38.50-38.66
R.R. Malleable	44.50-45.00
Axles	40.00-41.00
Rails, Rerolling	37.00-37.50
Rails, Random Lengths	35.00-36.00
Rails, 3 ft and under	39.00-39.50
Rails, 18 in. and under	41.00-41.50
Railroad Specialties	43.00-43 50
Uncut Tires	38.00-39.00
Angles, Splice Bars	38.00-38.50

* Brokers buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$31.00-34.00
No. 2 Heavy Melt. Steel	31.00-34.00
No. 1 Busheling	31.00-34.00
Nos. 1 & 2 Bundles	31.00-34.00
Machine Shop Turnings	28.00-29.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings	29.00-30 00
Cast Iron Borings	28.00-29.00
Bar Crops and Plate	35.50-37.00
Cast Steel	35.50-37.00
Punchings & Plate Scrap	35.50-37.00
Elec. Furnace Bundles	33.50-35.00
Heavy Turnings	32 00-33.50
Alloy Free Turnings	29.50-30.00
Cut Structurals	37.50-38.00

Cast Iron Grades

No. 1 Cupola	44.00-45.00
Charging Box Cast	38.00-40.00
Stove Plate	38.00-40.00
Heavy Breakable Cast	38.00-40.00
Unstripped Motor Blocks	40.00-41.00
Malleable	52.00-55.00
Brake Shoes	42.00
Clean Auto Cast	45.00
No. 1 Wheels	42.00
Burnt Cast	38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00-37.00
R.R. Malleable	52.00-55.00
Rails, Rerolling	40.00-41.00
Rails, Random Lengths	41.00-43.00
Rails, 3 ft and under	44.00
Railroad Specialties	42.00
Uncut Tires	41.00
Angles, Splice Bars	44.00

VALLEY

No. 1 Heavy Melt. Steel	$35.00
No. 2 Heavy Melt. Steel	35.00
No. 1 Bundles	35 00
Machine Shop Turnings	27.00
Short Shovel Turnings	28.00-30.00
Cast Iron Borings	28.50-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00-37.00

MANSFIELD

No. 1 Heavy Melt. Steel	$33.00-34.50
Machine Shop Turnings	27.00
Short Shovel Turnings	29.00

CINCINNATI

No. 1 Heavy Melt. Steel	$30.00
No. 2 Heavy Melt. Steel	30.00
No. 1 Busheling	30.00
No. 1 Bundles	30.00
No. 2 Bundles	30.00
Machine Shop Turnings	24.00
Mixed Borings, Turnings	23.00
Short Shovel Turnings	26.00
Cast Iron Borings	25.00

Cast Iron Grades

No. 1 Cupola Cast	41.00
Charging Box Cast	33.00
Heavy Breakable Cast	36.00
Stove Plate	31.00
Unstripped Motor Blocks	33.00
Brake Shoes	30.00
Clean Auto Cast	39 00
Drop Broken Cast	43.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.00
R.R. Malleable	48.00
Rails, Rerolling	38.00
Rails, Random Lengths	38.00
Rails, 18 in. and under	43.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$27.50-28.00
No. 1 Busheling	27.50-28.00
Nos. 1 & 2 Bundles	27.50-28.00
No. 3 Bundles	27.50-28.00
Machine Shop Turnings	22.50-23.00
Mixed Borings, Turnings	22.50-23.00
Short Shovel Turnings	23.50-24.00
Cast Iron Borings	23.50-24.00
Punchings & Plate Scrap	32.00-32.50

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast	25.00-27.00
Clean Auto Cast	33.00-34.00

BUFFALO

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	31.00-32.00
No. 1 Busheling	31.00-32.00
Nos. 1 & 2 Bundles	31.00-32.00
Machine Shop Turnings	23.50-24.00
Mixed Borings, Turnings	23.50-24.00
Cast Iron Borings	23.50-24 00
Short Shovel Turnings	24.00-25.00
Punchings & Plate Scrap	35.00-36.00
Elec. Furnace Bundles	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-38.00
Heavy Breakable Cast	33 00-34.00
Malleable	38.00-39.00
No. 1 Wheels	35.00-36.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$36.50-37.00
No. 2 Heavy Melt. Steel	35.50-36.00
No. 1 Busheling	36.50-37.00
No. 1 Bundles	35.50-36.00
No. 2 Bundles	35.50-36.00
No. 3 Bundles	33.50-34.00
Machine Shop Turnings	27.00-27.50
Mixed Borings, Turnings	25.00-26.50
Short Shovel Turnings	26 50-27.50
Bar Crops and Plate	38.00-40.00
Punchings & Plate Scrap	38.00-40.00
Cut Structurals	36.50-37.50
Elec. Furnace Bundles	36.50-37.50
Heavy Turnings	35.00-36.00
No. 1 Chemical Borings	31.00

Cast Iron Grades

No. 1 Cupola Cast	46.00-47.00
Charging Box Cast	45.00-46.00
Heavy Breakable Cast	45.00-46.00
Unstripped Motor Blocks	42 00-43.00
Malleable	52.00-53.00
Clean Auto Cast	45.00-46.00
No. 1 Wheels	45.00-46.00

NEW YORK

(Dealers buying prics, fob shipping point)

No. 1 Heavy Melt. Steel	$32.00
No. 2 Heavy Melt. Steel	32.00
No. 1 Busheling	32.00
Nos. 1 & 2 Bundles	32.00
No. 3 Bundles	30.00
Machine Shop Turnings	21.50-22.00
Mixed Borings, Turnings	21.50-22.00
Short Shovel Turnings	23.50-24.00
Punchings & Plate Scrap	32.00-32.50
Cut Structurals	32.00-32.50
Elec. Furnace Bundles	32.00
No. 1 Chemical Borings	23.50-24.00

Cast Iron Grades

No. 1 Cupola Cast	41.50-42.00
Charging Box Cast	41.50-42.00
Heavy Breakable	41.50-42.00
Unstripped Motor Blocks	35.00-36.00
Malleable	46.00-48.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$30.00
No. 2 Heavy Melt. Steel	30.00
Nos. 1 & 2 Bundles	30.00
No. 1 Busheling	29.00-30.00
Machine Shop Turnings	21.00-22.00
Mixed Borings, Turnings	21.50-22.00
Short Shovel Turnings	23.00-24.00
Bar Crops and Plate	31.00-32.00
Punchings & Plate Scrap	31.50-32.50
Chemical Borings	24.00-25.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	38.00
Heavy Breakable Cast	36.00-37.00
Stove Plate	37.00-38.00
Unstripped Motor Blocks	30.00
Clean Auto Cast	40.00

CHICAGO

No. 1 Heavy Melt. Steel	$31.00-31.50
No. 2 Heavy Melt. Steel	31.00-31.50
Nos. 1 & 2 Bundles	31.00-31.50
No. 3 Bundles	29.00-29.50
Machine Shop Turnings	25.50-26.50
Mixed Borings, Turnings	25.50-26.50
Short Shovel Turnings	26.50-27.50
Cast Iron Borings	25.50-26.50
Bar Crops and Plate	33 50-34.00
Cast Steel	33.50-34.00
Punchings	33.50-34.00
Elec. Furnace Bundles	32.00-32.50
Heavy Turnings	30.50-31.00
Cut Structurals	33.00-33.50

Cast Iron Grades

No. 1 Cupola Cast	37.00-41.00
Malleable	38.00-40.00
Clean Auto Cast	37.00-41.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-32.50
Rails, Rerolling	36.00-37 00
Rails, Random Lengths	33.00-34.00
Rails, 3 ft. and under	39.00-40.00
Rails, 18 in. and under	41.00-42.00
Railroad Specialties	37.00-37.50
Angles, Splice Bars	37.00-37.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	26.50-27.50
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings	22.00-23.00

Cast Iron Grades
(Fob shipping point)

No. 1 Cupola Cast	37.50-38.50
Charging Box Cast	30.00-31.00
Heavy Breakable Cast	29.00-30.00
Stove Plate	29.00-32.00
Brake Shoes	32.00-35.00
Clean Auto Cast	37.50-38 50
No. 1 Wheels	38.00-40.00
Burnt Cast	29.00-32.00

Railroad Scrap

R.R. Malleable	45.00-47.00
Rails, Rerolling	30.00-33.00
Rails, Random Lengths	30.00-33.00
Rails, 3 ft and under	37.00-39.00
Uncut Tires	32.00-34.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$31.00
No. 2 Heavy Melt. Steel	31.00
No. 1 Busheling	31.00
Nos. 1 & 2 Bundles	31.00
No. 3 Bundles	25.00
Long Turnings	22.00
Short Shovel Turnings	24.00
Cast Iron Borings	23.00
Bar Crops and Plate	32.00-33.00
Punchings & Plate Scrap	36.00-37.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-39.00
Stove Plate	34.00-35.00
No. 1 Wheels	32.00-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00
R.R. Malleable	37.50-38.00
Axles, Steel	33.00
Rails, Rerolling	36.00-37.00
Rails, Random Length	30.00-31.00
Rails, 3 ft and under	32.00-33.00
Angles and Splice Bars	32.00-33.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles	27.50

Cast Iron Grades

No. 1 Cupola Cast	30.00

Unretouched photo of Tube Turns forging right off the press

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TUBE TURNS tt Forgings for Industry

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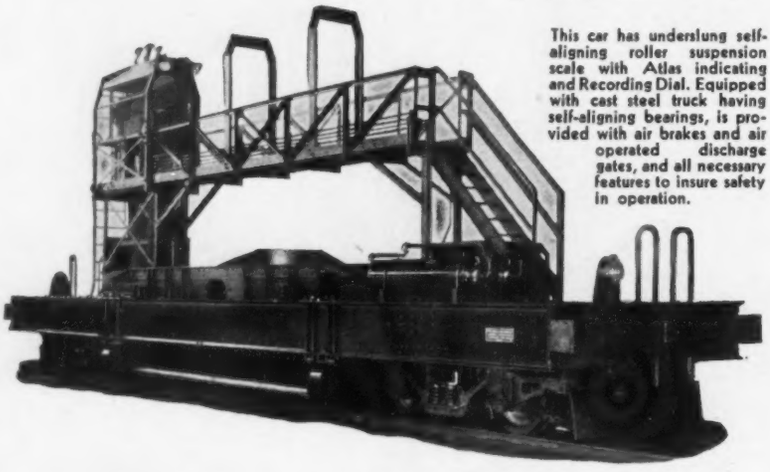
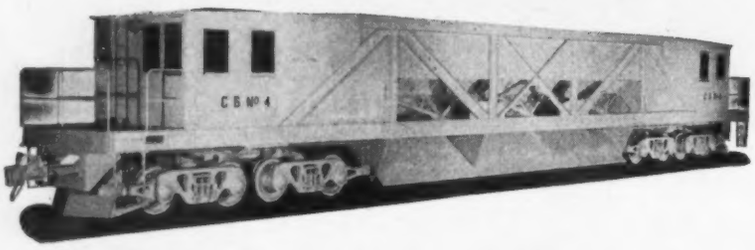


This car has underslung self-aligning roller suspension scale with Atlas indicating and Recording Dial. Equipped with cast steel truck having self-aligning bearings, is provided with air brakes and air operated discharge gates, and all necessary features to insure safety in operation.



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ENGINEERS MANUFACTURERS

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Sheets, Strip. . .

Pressure for deliveries of flat-rolled products continues heavy

Sheet Prices, Page 156

Pittsburgh — Sheet and strip output is not expected to be immediately affected should a coal mine strike occur early next month. Third-quarter production schedules, established on basis of uninterrupted operations, indicate no significant revision from the current period. A few isolated instances are reported of customers holding up shipments on portion of allotted tonnage, reflecting filing up of inventory pipe lines at the consumer level. However, openings in rolling schedules have been quickly taken up, and present overall output is still substantially below urgent requirements of most customers. Electrical, enameling and galvanized sheets are in particularly short supply. Continuation of present production pace through third quarter should ease acute pressure for prompt deliveries as consumers' inventory pipe lines achieve better balance in relation to projected production schedules.

New York — While one large producer is accepting sheet specifications for October and is accepting them on about the same tonnage basis as for the preceding months, sellers generally are accepting nothing in sheets beyond the third quarter, a period for which most of them have been tightly booked for some time. They will probably do little for the final quarter much before August, except on steel for the car program for which they have been making future promises a little more freely than in other cases.

Demand far exceeds supply, and companies which have no prewar suppliers are finding the going increasingly tough. In fact, an increasing number of these companies are now passing out of existence entirely. Mills consider it their obligation to take care of old customers first and in view of the unbalanced situation with regard to supply and demand have little or nothing they can supply many of these newer companies. As it stands they have not been able generally to meet the requirements of the older companies, all of which has accounted for the voluntary rationing programs.

Philadelphia — While less pressing in some quarters, sheet demand in general is still strong. Sellers look for no pronounced easing for some time, although admitting that once demand does begin to really soften it may decline faster than many now anticipate. Only in stainless is there any suggestion of sluggishness and in this product the situation is sluggish. Deliveries on stainless can be had wihin five weeks.

Cincinnati—Sheet mills are receiving frequent requests for changes in delivery dates, possibly in accord with vacation plans, but virtually none is cutting back tonnage. Proffered orders and pressure for larger quotas make the market appear as if demand for flat rolled products is at record peak. The only exception, as heretofore, is in stainless. Mills are not yet entering tonnage for fourth quarter, but foresee sustained demand through that period.

Chicago — Sheet and stripmakers in

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NEVER was there a partnership like the nation-wide brotherhood of volunteers who have helped sell, advertise, and promote sales of U. S. Savings Bonds! Their program is the greatest sales operation at the lowest cost in history.

Your continued support in promoting the Payroll Savings Plan will help "America's partnership" this year to repeat or surpass last year's four-star performance, in which sales of Savings Bonds were 7½ billion dollars—*exceeding redemptions by far more than a billion!*

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New Savings Bonds Plan won't affect the P.S.P.

THE Treasury Department and the banks of America are making it possible for farmers, doctors, and other self-employed people to participate in "automatic" Bond buying by special arrangement with their banks. This extension of the Savings Bonds program is not a partial payment plan and is intended *only* for people who are not in a position to take advantage of the Payroll Savings Plan.

The Treasury Department acknowledges with appreciation the publication of this message by

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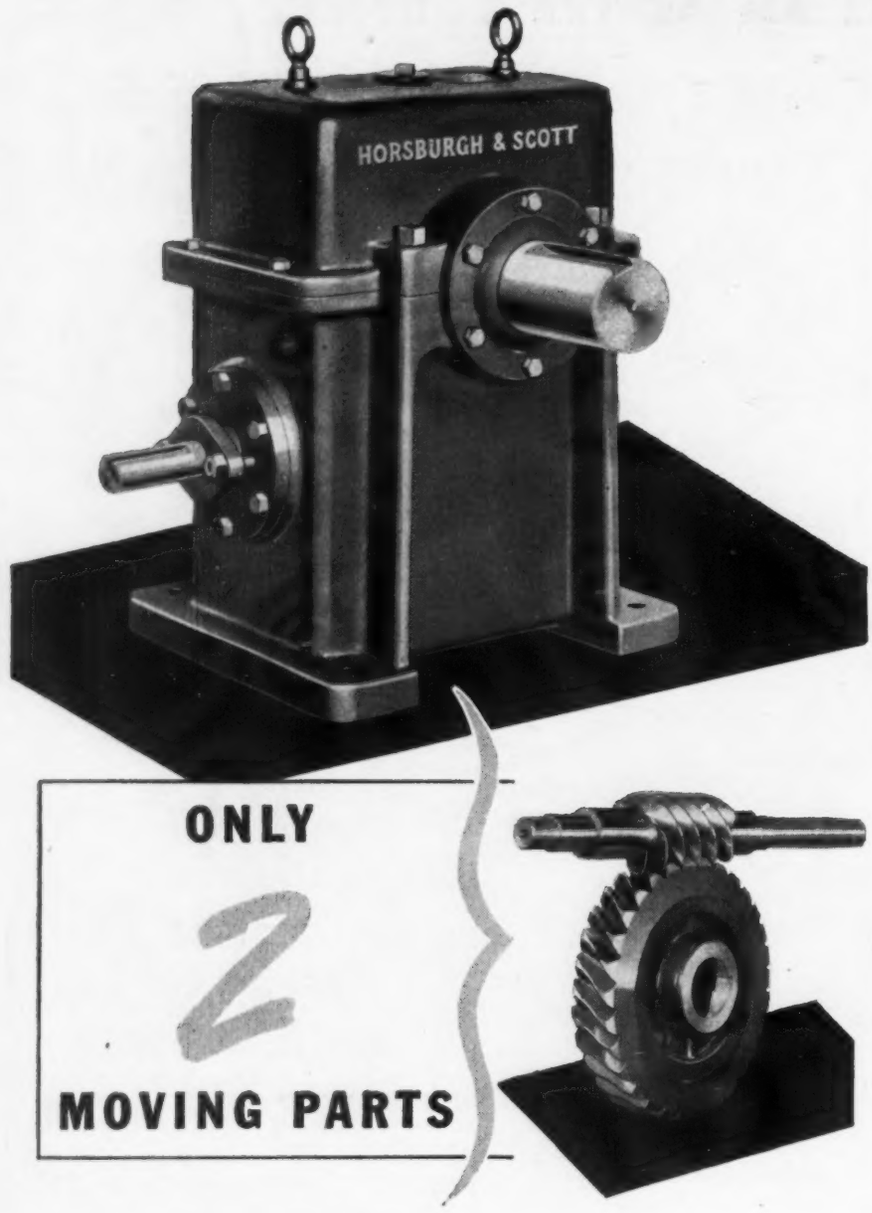

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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this district report that quotas assigned are being fully taken up by customers and even larger allocations are sought. Requests for deferred shipments of flat rolled are so few as to be inconsequential. In the case of farm implement and equipment makers, instances are heard where quantity of galvanized sheets is the limiting factor in determining how much of this equipment can be assembled and shipped.

St. Louis—Sheet production continues to increase with strike delays at Granite City Steel Co. largely ended. Open hearth output currently is devoted to filling empty "pipelines" in the mill and operation near 100 per cent of capacity is predicted within two weeks. Company has completed a recheck of backlogged orders and has found third quarter schedules on hot-rolled sheets filled. Books on hot sheets were technically opened last week for the third quarter for the first time in nearly a year. Limited tonnage for hot-rolled is open for the fourth quarter. Cold rolling capacity is filled to the year's end. Pressure for all flat steel is unremitting and big consumers continue to tender two and three-year contracts at a minimum of present prices for a guaranteed annual tonnage, providing deliveries are started this year. Mills are rejecting the offers rather than set back old orders still farther.

Birmingham — Even though sheets and strip are being turned out here probably at the highest rate in history, available supplies remain short of current requirements. While inventories are in balance, a somewhat better overall situation is in evidence. This is due in part at least to the approaching vacation season.

Steel Bars. . .

Bar Prices, Page 156

New York — One large producer is now accepting specifications on hot carbon bars for fourth quarter on the basis of third quarter selling quotas. This is not a positive guarantee that the consumers will necessarily get the full amount; nor is it a move that will preclude still more tonnage. It is an effort on the part of the producer to give his customers a fair idea as to what they might count on so that they can plan accordingy. This seller previously had been quoting strictly on a basis of one quarter at a time. The move indicates a somewhat easier outlook, barring major labor disruptions.

Various sellers of cold carbon bars have been quoting for some time on the more future positions, because of the less stringent situation in that product; and in as far as the alloys are concerned, sellers have been offering for many months both hot and cold steel for shipment as far as consumers care to specify. The situation in alloys has been decidedly easy since the end of the war, and easy even for some time before that. At present deliveries are offered at around four to six weeks on hot alloy steel, and in general a little beyond that on cold alloy.

Philadelphia—Hot-rolled carbon bars continue in somewhat easier supply. Actually, supply and demand may not come in balance for some time, especially in the small sizes. Producers are making progress in reducing order backlogs and one large producer recently opened books

to regular customers for fourth quarter specifications on the basis of third quarter selling quotas .

Pittsburgh — Sellers report relatively little tonnage held up to date due to unbalanced consumer inventories. The acute shortage of sheets and strip has in some instances limited production schedules of end products, which in turn has thrown carbon bar inventories out of balance. Some easing in demand is noted from forge shops and auto parts suppliers. Most carbon bar producers are booked through third quarter, and deliveries would be further extended, particularly within small size ranges, if mill distribution were not under strict allocation. Demand-supply situation in hot-rolled alloy bars continues in good balance with some mills promising deliveries on larger sizes within 2 to 3 weeks; small sizes, in 4 to 5 weeks. Overall alloy demand compares favorably with prewar, but industry's capacity is up sharply. Greater portion of incoming tonnage is for open-hearth alloy grades. Cold-finished order backlogs are extended 3 to 4 months for most sizes, although deliveries on flats, rounds, etc., within the very small size ranges, are not available until late this year.

Chicago — Pressure which consumers apply to steelmakers for carbon bars, not only in seeking more pompt deliveries but increased allotments, reflects the unbalanced inventory situation in which most metal goods manufacturers find themselves. Reports are heard frequently that only a comparatively few tons of certain sizes and analyses of bars would release substantial volume of partially completed assemblies for shipment. Tool and die shops are in better position, now being able to make deliveries in a few weeks as compared with months recently. Forgers continue to report heavy backlogs.

Steel Plate. . .

Plate Prices, Page 157

Pittsburgh — One large fabricator states order backlogs are further extended than six months ago, despite relatively good mill shipments of plates and structurals. However, this is not generally true for the industry as a whole. Usual volume of small orders is below that reported early this year. Steadily rising construction costs continue to result in bids far exceeding funds set aside for many programs, particularly for municipal projects. Unusual heavy demand for plates is noted for industrial stand-by fuel tanks to offset anticipated acute industrial gas shortage this winter. Substantial plate tonnage also is required for barge construction. United States Engineers recently awarded Pittsburgh-Des Moines Steel Co. a contract for three aluminum bridges, weighing 15, 125 and 150 tons; all structural members to be welded and riveted.

New York — While some customers are pressing less actively, the over-all situation in plates continues strong. Whether there will be any material easing before the end of the summer is still a question, especially with producers generally tightly booked up for the third quarter and those who are accepting tonnage for shipment beyond having no difficulty filling shedules for the remainder of the year. However, while no cancellations have been reported in this

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cancellations, there have been a few elsewhere along the seaboard and should this trend grow to any extent it could change the outlook rather materially.

Philadelphia — District plate sellers will enter the new quarter with arrearages of three weeks' to three months' work. This represents an improvement in some instances compared with three months ago, and has not changed the overall situation appreciably. Export controls have been further tightened on plates, exporters now having to supply data with respect not only to destination but consumer's name, end use and other details in applying for license. The order became effective June 6, although most sellers were not advised until several days later. Previously, and in effect since Mar. 22, a quarterly licensing system had been in operation. All unshipped tonnage licensed under this system will be allowed to be exported despite inauguration of the latest policy.

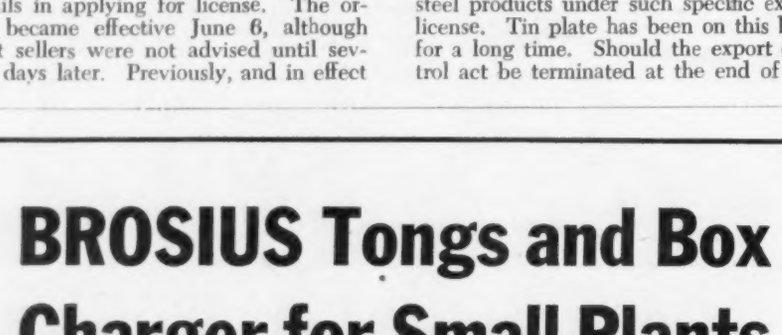
Sun Shipbuilding & Dry Dock Co., Chester, Pa., has been awarded construction of a large seagoing dredge for the Army, requiring 6500 tons of plates and 1000 tons of shapes and bars, mostly shapes. The company will require 5000 additional men, or more than double its present force which has been cut drastically since the war.

Plates and tin plate are the only two steel products under such specific export license. Tin plate has been on this basis for a long time. Should the export control act be terminated at the end of this month, these restrictions would automatically end. However, steel exporters believe export control will be extended.

Birmingham—Some progress has been made in reducing order backlogs of plates, due mainly to limitation of bookings. New volume is not as large as in the past few months. Car production at Bessemer is taking the bulk of tonnage locally with considerable improvement in inventories reported by the Pullman plant. Result is stepped up production toward a goal of 50 cars a day.

Seattle — Fabricating shops report a steady demand for tanks, boilers, smoke stacks and other jobs involving steel plate. Supplies are inadequate and new work is confined to materials available. Large tank installations, involving major tonnages of plates, are reported under way at Alaskan centers adjacent to military projects now under construction.

BROSIUS Tongs and Box Charger for Small Plants



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SHARPSBURG, Pittsburgh (15) PENNSYLVANIA

Tubular Goods...

Tubular Goods Prices, Page 157

Pittsburgh—Pipe and tubing output is scheduled to be sharply curtailed early next month, reflecting vacation shutdown of plants here and other districts early in July. Shortage of carbon tube rounds continues to retard tubing production schedules, which are still well below stated requirements despite slight easing in demand. New orders for stainless and alloy tubing also are off slightly. Jobbers expect no improvement in inventory status of standard pipe items through remainder of this year, while demand, which is far in excess of supply, shows no significant signs of easing. Scarcity of pig iron remains major retarding factor in output of cast iron pipe. With cast pipe delivery promises extended 18 to 24 months, much municipal work continues to be held up.

Clayton Mark & Co., Evanston, Ill., recently established a price base at Chicago, on electric weld mechanical tubing, at $4 a ton over the nominal basing points of Cleveland, Detroit and Toledo.

New York—Portland Pipe Line Corp., which pumps oil 236 miles from Portland, Me., to Montreal, Canada, will build a new 20-inch pipe line, doubling its present capacity as soon as materials are obtainable. Built by Standard Oil of New Jersey during the war, the property was sold in 1946 to four Canadian companies, British-American Oil Co. Ltd., Imperial Oil Co. Ltd., McColl Frontenac Oil Co. Ltd. and Shell Oil Co. of Canada Ltd.

Seattle — Several sizable tonnages of cast iron pipe are pending, bids being in at Bellingham for 500 tons, 1300 tons at Tacoma, Wash., and 250 tons at Oroville, Wash. Agencies are basing tenders on 18 to 24-month deliveries and report the mill situation continues critical. There is a large potential demand in this area.

Wire . . .

Wire Prices, Page 157

Chicago — Wiremakers foresee a tremendous demand for bale ties and baling wire in the weeks ahead, the abundance of rain in the northwestern area meaning that the hay crop will be a bumper one. On the other hand, demand for electrical cable has eased. Sales of wire rope are more numerous, but quantities involved are smaller. In construction materials,

requirements for building and pipe mesh have fallen off, while need for welded fabric for paving shows a seasonal expansion.

Birmingham — Supply of most wire products remains extremely tight in this territory. Drawn wire is somewhat easier, but still not in sufficient supply to meet all needs of processors. Wire fencing and nails are scarce and likely will remain so at least through next quarter.

Bolts, Nuts. . .

Bolt, Nut, Rivet Prices, Page 157

Cleveland — All leading bolt and nut producers in this district revised and simplified their price schedules last week, bringing them in line with those recently issued by eastern producers. Small-diameter, short-length machine bolts were advanced 15 to 20 per cent while small-diameter, long-length bolts were advanced about 7 per cent. On larger bolts the changes varied widely from moderate advances to reductions. Nut prices were reduced around 2 to 3 per cent. Whereas the former schedule carried seven size classifications of machine bolts, the new schedule has only three. The price advances were made to cover increased costs of labor and materials.

The new schedule on carriage and machine bolts is as follows: ½-in and smaller, up to 6 in. in length, 48 off; 9/16 and 58 x 6 in. and shorter, 50 off; larger diameter, longer than 6 in., 47 off. Tire bolts are quoted 38 off. Stove bolts, in packages, nuts separate, are 65-10 off; lag bolts, 1/4-in. up to 1 in.. 6-in. and shorter in length, 50 off, longer than 6 in., 48 off.

Semifinished hexagon nuts, A. S. regular and heavy, are quoted as follows: 1/2-in. and smaller, 50 off; 9/16-in. through 1 in., 49 off; 1⅛-in. through 1½-in., 47 off; 1⅝-in. and larger, 40 off.

Reinforcing Bars. . .

Reinforcing Bar Prices, Page 156

Chicago — A slight quickening of demand for reinforcing steel is discernible, but suppliers show little interest in figuring it. Already overcommitted and knowing they cannot obtain increased tonnage of steel from mills, they prefer to struggle along in handling comparatively small jobs for a relatively greater number of contractors. Paving jobs are becoming more numerous and are adding considerable tonnage to heavy demand backlog.

Seattle — Reinforcing bar mills are struggling to keep pace with demand, finding it difficult to reduce order backlogs. Capacity operations are reported, many bookings of less than 100 tons being taken. Regular customers and emergency public work jobs have first call.

Structural Shapes. . .

Structural Shape Prices, Page 157

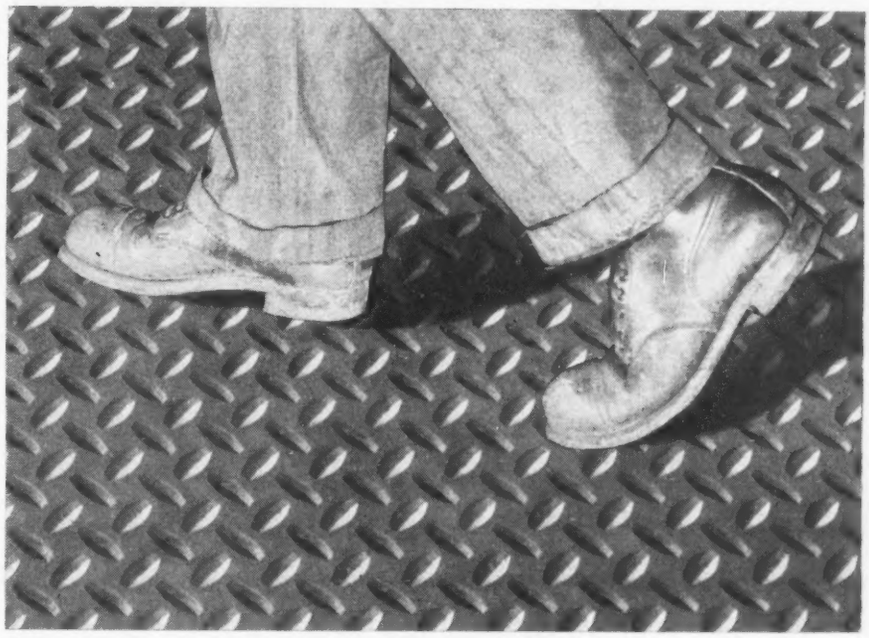
New York — Although few structural awards have been reported over the past week, the recent slight improvement in demand is being sustained, and several sizable jobs are in prospect for this summer. Included are the municipal Hospital for Chronic Diseases, Welfare Island, estimated to require 3000 tons; Kings County Hospital addition, Brooklyn, 2500 tons; and the James Ewing Memorial Hospital, 1500 tons.

Philadelphia — While structural steel activity still lags, several fair inquiries are reported. Meanwhile the government continues to approve a large proportion of nonhousing projects now pending. During the period June 5-12, inclusive, approval was given in this district to 75 projects, valued at $2,057,285, against rejections of 21 projects, valued at $105,830.

Chicago — New inquiry for fabricated structural steel is coming out in smaller volume, a situation which is not entirely unwelcome to fabricators who are booked for months ahead and limited in their operations by the steel they receive from mills under their quotas. Explanation for the smaller volume of inquiry is the current high cost of construction, as well as the fact that desired deliveries cannot be obtained. Under these conditions, prospective builders are inclined to shelve plans until conditions are more propitious.

Birmingham — The shape situation shows little change from that prevalent over the past few weeks. Demand is described on the whole as somewhat spotty. Some pending building projects are being talked again with prospects that plans will be revived. Others are being held indefinitely in abeyance.

Seattle—Fabricating plants are operating close to capacity in spite of scarcity of steel, although some larger projects have been declined due to the supply situation.



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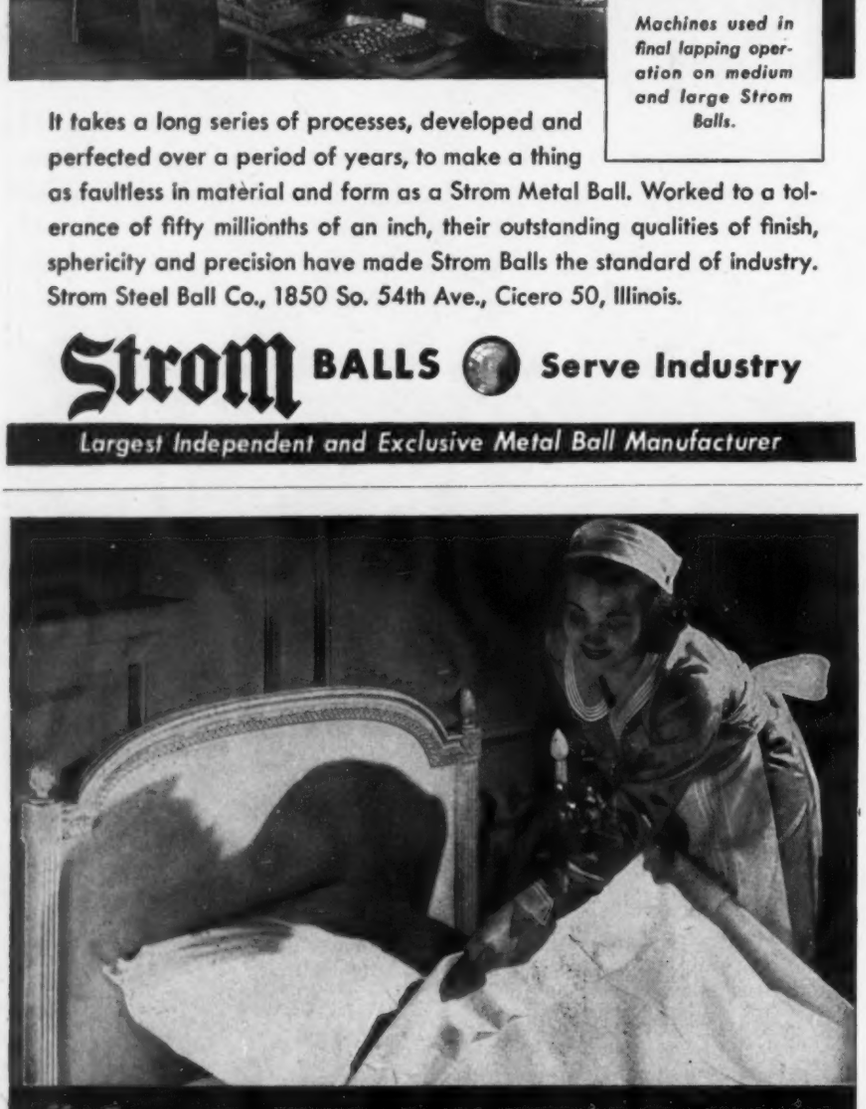

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Tin Plate. . .

Tin Plate Prices, Page 157

Pittsburgh — Tin plate demand continues to tax mill production schedules, despite unfavorable food packing outlook due to unseasonable planting weather. Pressure for delivery remains acute for most type containers particularly oil and beer cans, although some easing is noted for crown closures and coffee containers. General line can requirements are expanding, with preference noted for electrolytic tin plate, and are expected to offset anticipated easing in tin plate demand for perishable food pack program. Other offsetting factors are extremely heavy demand for export and fact container companies' tin plate inventories are abnormally low. Sellers state that while pressure has been great for additional quotas from most consumer groups, distribution pattern since termination of the war has been on basis of prewar customer relationship with exception of relatively minor dislocation developing out of establishment of new basing points.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 158

Pittsburgh — Prompt curtailment of beehive coke output is expected should a coal strike develop early next month, which would force almost immediate reduction in foundry and blast furnace operations. Steel producers' and independent by-product interests' coal stocks are reported normal. It is estimated that most plants have sufficient soft coal supplies to sustain 2 to 3 weeks' capacity output. Individual company inventory position would be extended, of course, to the extent coking operations would be curtailed in event of a coal strike. Foundry coke recently has been in somewhat better supply here than pig iron, but this situation would soon be reversed should a coal strike develop. The lone merchant pig iron producer in this district is expected to maintain full scale iron output for at least a month in event of possible shut-off of soft coal shipments.

Spot sales of Connellsville beehive and foundry coke recently have been made at substantially higher price levels, reflecting very active buying on the part of consumers in an attempt to fortify themselvess in event of a possible shutdown of coal mining operations. Sizable tonnage of beehive coke recently sold as high as $11 a net ton, an increase of $1.50 over former top of price range; some foundry coke has sold for $12, an advance of 50 cents. However, bulk of beehive coke is selling within price range of $9.50 to $10.50; foundry coke at $9.75 to $12.

Cleveland—Supply of foundry coke has tightened further during the second quarter due to the fact that foundries have increased operations while ovens have been operating at full capacity for some time and, hence, have been unable to increase their production. Some improvement in the supply situation may develop during the third quarter, however, when many foundries will close for vacation periods. Prices are unchanged on the basis of $15.90 a net ton, delivered Cleveland, and $14.60, Painesville ovens.

Pig Iron. . .

Pig Iron Prices, Page 158

Cleveland — High silicon silvery pig iron prices have advanced $2 a ton to the basis of $42.50 per gross ton, fob Jackson, O., and $43.75, Buffalo. Producers of other grades of iron have held prices unchanged. Supplies of iron are still tight with shipments being made only to regular customers to cover current requirements, very little being moved into inventory. Foundry operations have been stepped up during the second quarter, but the rise has been checked by the scarcity of coke. Many foundries expect to close down for vacations soon and may be able to improve their raw material supply positions during that period.

Pittsburgh — Increased pressure for prompt pig iron shipments has developed as July 1 deadline for the coal mining contract negotiations nears without apparent prospect of peaceful settlement. Lone merchant iron producer here has over a month's supply of coal for its by-product coke operations, but in event of a coal strike this company may almost immediately curtail sale of by-product coke in open market. In recent months foundry pig iron shortage has been more acute than coke, although this situation would soon be reversed should a coal strike develop. Carnegie-Illinois Steel Corp. has the equivalent of 1½ blast furnaces down to conserve coke in anticipation of coal miners' vacation period scheduled to start June 28; company was forced to blow out one furnace at the Carrie Works last week for relining from mantel up. There are 43 out of 47 units currently pouring iron in this district.

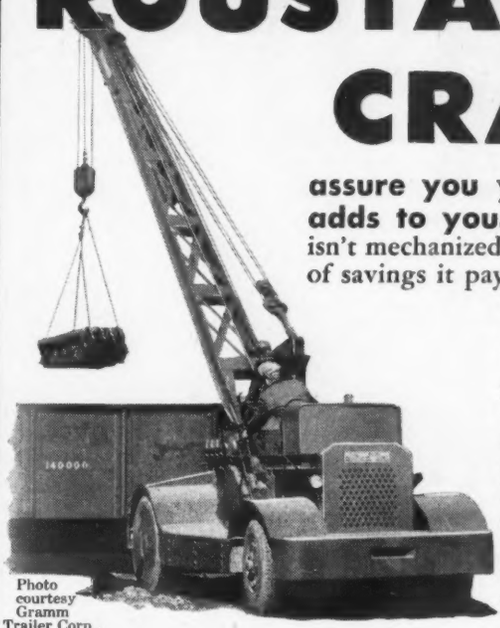
Philadelphia—While there is still more uncertainty as to what may develop with respect to pig iron allocations for the housing program after this quarter, specifically with regard to pipe, some leading sellers are planning to restore distribution after this month to the normal prewar basis. Producers generally look for an end this month to government subsidies under the foundry iron production incentive system. This, along with a probable increase in fuel as a result of likely higher wages in the soft coal fields after the present contract negotiations are concluded, may lead to generally higher pig iron prices within the next few weeks.

One district producer is threatened with termination of his by-product coke contract at the end of July because of intended diversion of the coke by the supplier to the production of water gas. Should this develop, the pig iron producer may encounter a serious disruption of output.

New York — Pig iron melt here will be down slightly this month, due primarily to vacation suspensions which are now beginning to get under way at some plants, and which will be more of a retarding factor in July, as many foundries will close down for a week or so around July 4. As in previous months, more iron could have been consumed if more of this commodity and coke had been available. However, the situation with respect to coke in this immediate district has not been too stringent recently. In fact, at present, supply of coke appears to be sufficient to meet general needs.

Buffalo — Although leading merchant iron producers are having no trouble

ROUSTABOUT CRANES



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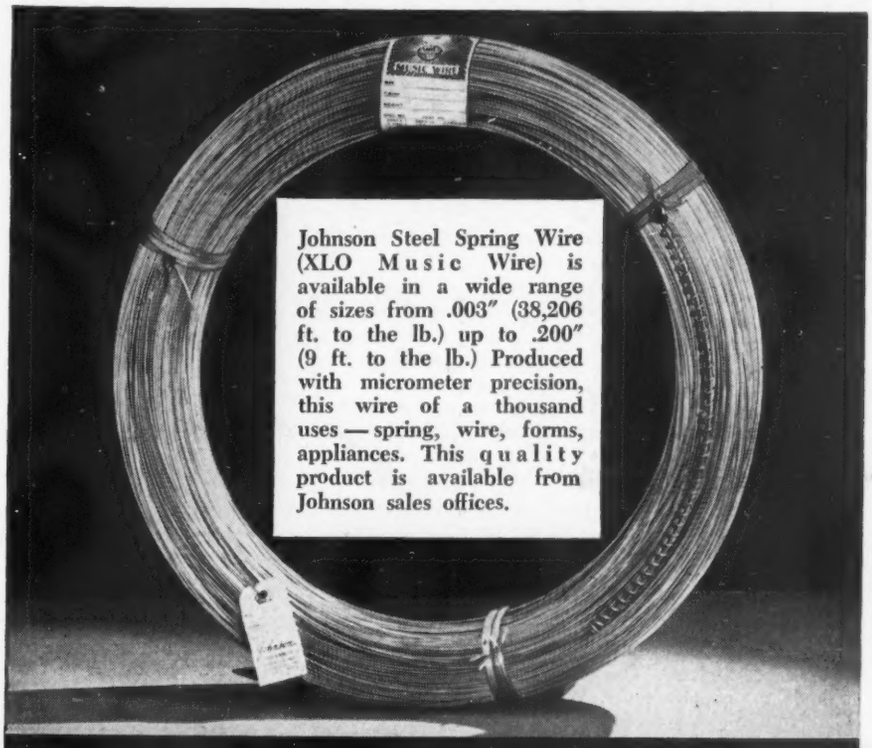

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finding buyers for their entire current output, a definite falling off has been noted in recent record-breaking demand. An increased number of small foundries report order backlogs shrinking. One smelter, Dunkirk Foundries Inc., which has been operating two days a week, closed down completely because of insufficient orders. While this foundry is an exception, a large number of other melters reported that they were looking for new orders to maintain operations. Blast furnace operations remain at the reduced rate of 87½ per cent of capacity as two stacks are idle.

Cincinnati — Although scrap is in easier supply, the foundry melt is stabilized, well under capacity, by allotments of pig iron and coke. Melters press for iron deliveries despite approach of vacation periods. Some will ask change in delivery dates but none is willing to cut back tonnage in view of the light inventories.

Chicago — Pressure for foundry pig iron shows no sign of easing and demand for coke is equally as tight. This situation, coupled with the fact that a coal mine shutdown may occur after June 30, casts uneasiness over the foundry field. It is inevitable that any halt in coal mining would have immediate repercussions. While the subsidies on iron for housing end June 30, it is not likely that the action will cut much figure as far as supply is concerned. In this area, not a great deal of iron has been earmaked for housing for some time. One blast furnace in this district which has been making mostly merchant iron will convert half of its capacity to basic which is needed for steelmaking.

Birmingham — Pig iron supply remains tight. Blast furnace interests have been producing at capacity, but supplies are not adequate in most instances. Irregular curtailment of operating schedules is still reported by some industries because of the iron shortage.

Seattle—Pig iron supplies are inadequate to meet the strong demand. Producers halted shipments in May but are making limited deliveries this month. This has resulted in a slightly easier supply situation. Prices are unchanged.

Iron Ore. . .

Iron Ore Prices, Page 158

Cleveland — Consumption of Lake Superior iron ore increased 306,180 tons in May to 6,884,803 tons from 6,578,623 in April and compared with only 2,990,189 in May of last year, according to the Lake Superior Iron Ore Association, this city. Total consumption for the first five months of this year amounted to 33,730,770 tons compared with only 19,247,352 in the like 1946 period.

Of the May total, 6,635,708 tons were consumed in the United States and 249,095 in Canada. As of June 1, 166 furnaces in the United States and 8 in Canada were in blast while 17 and 2, respectively, were idle. This represented an increase of three furnaces in blast in this country.

Total stocks of Lake Superior ore on hand as of June 1 amounted to 17,618,341 tons compared with 13,554,803 tons a month earlier and 23,904,998 tons a year ago. Of the June 1 total, 2,077,802 tons were on Lake Erie docks in the United States, 14,939,215 tons at furnaces in this country and 601,324 tons at furnaces in Canada.

Scrap. . .

Prices move sharply higher in East and in Chicago . . . Buyers still cautious

Scrap Prices, Page 162

Philadelphia — Scrap prices increased sharply in this district again last week with revisions covering the entire list. No. 1 heavy melting steel rose about $4 a ton with other grades advancing $1 to $4. The Pennsylvania offering of 10,000 tons of No. 1 railroad steel scrap brought prices of more than $39, delivered to Pittsburgh mills. Less than two weeks previously the Baltimore & Ohio list was allocated on the basis of around $36.50, delivered.

Steel scrap consumers are still buying cautiously, although total volume of tonnage involved is substantial. Consumers' stocks are fair, but not as large as buyers would like to have them, especially in view of the threatened coal strike which, if it develops, would have almost an immediate effect upon pig iron production.

Representative prices follow: No. 1 heavy melting, $36.50 to $37, delivered; machine shop turnings, $27 to $27.50; bar crops and plate, $38 to $40; No. 1 cupola cast, $46 to $47; malleabale cast $52 to $53.

New York—Sharp competition among brokers in covering on old orders is primarily responsible for another stiff increase in the market here. Brokers are offering around $32, fob shipping point, on the major open hearth grades, an increase of about $4.50 to $5 a ton. They also have advanced prices 50 cents to $3 a ton on various other grades. Malleable appears to be about the only item unchanged, and this may be only for the moment, for this grade is strong. Consumer buying is fairly active, especially in eastern Pennsylvania, but current strength is due principally to the broker competition noted above.

Cleveland — Undertone of the scrap market here remained strong last week with No. 1 heavy melting holding at $31 to $34, delivered. Demand was particularly heavy for blast furnace grades as users are increasing consumption of scrap in order to conserve coke in the face of a threatened shut down of coal mines. It takes less coke to melt 1 ton of turnings than it does to melt 1.75 tons of ore, both producing about the same amount of iron. Furthermore the melting time is reduced as the proportion of scrap used in the mix is increased. Prices advanced $1 to $2 a ton to $28 to $29 for machine shop turnings and cast iron borings and to $29 to $30 for mixed borings and turnings and short shovel turnings. Stove plate charging box and heavy breakable cast prices were higher at $38 to $40. A mill in the Mahoning Valley paid $30 for machine shop turnings and $32 for short shovel turnings but these sales involved special specifications. While shipments are moving in good volume, collections from farms have been restricted due to adverse weather conditions while those from auto wrecking firms have been below the prewar level due to continued demand for old cars for transportation purposes. Foundries have improved their scrap inventory position to about a 45-day

level, but are still short of coke and pig iron.

Buffalo—Prices on scrap pointed higher last week as dealers were refusing additional business at the prevailing range of $31 to $32 a ton for heavy melting and bundles. Consumers, however, were likewise holding their bids to the quoted range, but it was admitted that stronger tendencies dominated the market. In fact, the trade was alive with gossip that fresh sales were expected momentarily at advanced prices. Strength developed as scrap receipts failed to show the usual seasonal expansion. Only one of the three leading consumers in the area was reported adding to reserve stocks.

Pittsburgh — Local scrap purchases continue relatively inactive and on a selective basis. The $32.50 price level for heavy melting steel was definitely established last week by a 2500-ton purchase for a local mill. However, one large consumer continues to hold up shipment on old $30 orders, while other interests are either out of the market or buying on a restricted basis. Some open-hearth scrap is coming into this district from remote points at above $32.50, but bulk of this scrap continues on basis of mill-customer price negotiations. With scrap prices moving upward in outside districts, the market here is definitely stronger.

This situation is further bolstered by recent purchase of select grades of railroad heavy melting steel by a leading broker at $38.66, and specialties for $43.50. Some pressure is being put on the railroads to help stabilize the scrap market for the high prices at which railroad scrap recently sold encourage other interests to hold on to their scrap in expectation of further advance in prices. The spread between railroad and industrial heavy melting steel prices is much greater than normal practice, due in part to active interest on part of foundries for select railroad scrap items.

Mill practice of melting ingots for customers to be rolled elsewhere, with buyer furnishing the scrap, is said to be a contributing factor in the unsettled scrap market situation. Cast iron scrap grades remain strong, with No. 1 cupola selling within range of $40 to $41. No price change is noted for short shoveling turnings at $28.50 to $30.

Sharp upturn in scrap prices in other districts has prompted many industrial scrap sources to hold out for substantially higher dealer and broker buying prices for local mills, and also has resulted in considerable tonnage purchased here for shipment to plants outside this district. Many brokers claim the advance in general scrap price levels has made it impossible for them to pick up material to fill lower-priced orders.

Detroit—Flurry in scrap price appears to have subsided and the market is holding steady again. Local mills continue in the market but are not taking any important tonnage. Flow of automobile production scrap is strong, with assemblies firm and close to 100,000 per week.

Cincinnati—Scrap prices have moved upward again, heavy melting steel being quoted $30, an advance of $1. Other grades take parallel increases. The market is showing greater activity, although there may be some tonnage withheld on speculation. Some district interests consider the rise a reflection of limited supply against the persisting

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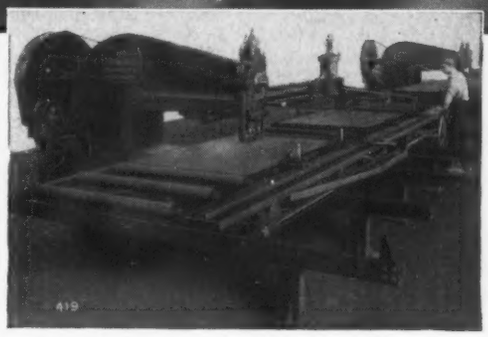

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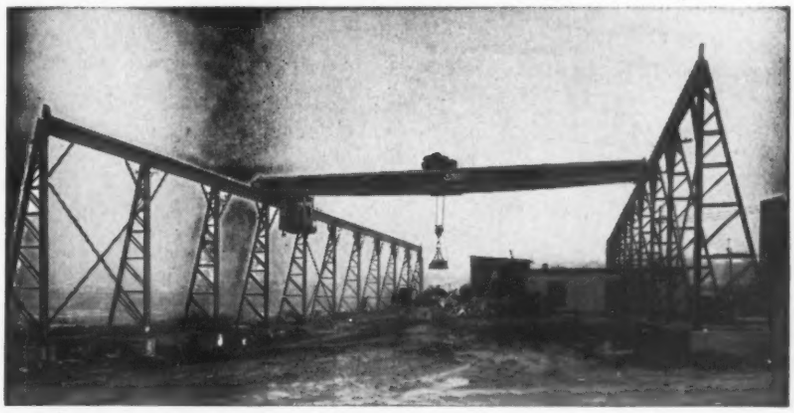

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high steelmaking rate. Valley purchasing and bids for railroad lists help strengthen the undertone.

Chicago — Open hearth scrap has advanced to a high of $31.50, delivered mill, an increase of $2.50, thus ending a confused price situation which has been existing in this market. Until this advance became official, consumers had remained pretty well out of the market and had resisted the higher price level which started in eastern steelmaking districts. Buying has been of only moderate volume, old contracts plus direct purchases having been bringing in enough material to match melting requirements. It would appear that consumers are now interested in strengthening their stocks in case a coal mine shutdown occurs after June 30, a development which would result in substantial blast furnace banking almost immediately and thus reducing hot metal for open hearths.

Mills are differentiating between factory and dealer scrap by 50 cents to $1 per ton, the $31.50 price applying to the former. This variation of the customary practice is to encourage shipment of factory scrap direct to mills and has an advantage qualitywise. Inferior scrap has been hindering steel production lately because of too many off-heats. Flood conditions in the western area are restricting scrap collections and preparation.

St. Louis—Scrap shipments to this district continue to decline due to the fact that many shipments are going elsewhere for better prices. Local prices are showing a firming tendency, however. Many big scrap consumers have been holding off in the price uncertainty, others buying only on dips. Mill and foundry reserves range from 45 to 60 days, enabling melters to be more selective. Railroad lists have been selling at a fairly high figure and volume is good. Railroads are moving all the scrap that steel replacements will permit. Fear of a coal strike is stimulating some scrap buying, since a fuel shortage would reduce pig iron production and compel greater use of scrap. As a result of such hedging, some observers predict scrap prices will drop if the coal strike is averted definitely.

Birmingham—Scrap prices rose sharply last week with heavy melting, bundles and busheling registering a $4 gain from $27 to $31. No. 1 cast is quoted $38 to $39. Also up $4 is No. 1 railroad heavy melting at $32. District mills have re-entered the market and the flow is described as not satisfactory in volume.

Seattle—The steel scrap market continues to improve slightly, shipments being somewhat in excess of consumption. Inventories are growing slowly. Prices are unchanged. The national movement to expedite the flow of scrap, with particular attention to disposal of surplus government materials, is expected to bring results shortly. L. G. Knight, Bethlehem Pacific Coast Steel Co., has returned from a Navy-sponsored tour of the Orient in a survey of potential scrap supplies.

Watervliet, N. Y.—Watervliet Arsenal will open bids Aug. 4 on sale of about 1000 tons of unprepared heavy melting steel scrap. Half of this tonnage consists of 40 mm forgings, each weighing about 375 pounds.

200 lb Steel Will Build Refrigerator, Lawn Mower

Two hundred pounds of steel cover the metal requirements for a refrigerator and a lawn mower, according to data received by the American Iron & Steel Institute from manufacturers. Actual figures indicate that 171.66 lb of sheet and strip steel are required in the manufacture of a refrigerator, and 27.60 lb of sheet, strip, bar, wire and tube steel are needed to make a lawn mower.

Warehouses Raise Cutting Extras on Some Products

Cleveland—Leading warehouses have revised cutting extras to cover the net increase in labor costs since the last previous revision in 1933. Since 1939-41 period, labor costs have advanced around 70 per cent, but improved techniques and use of modern machinery have reduced the increase in actual labor costs to around 25 to 35 per cent.

Cutting extras have been generally increased, although some have been held unchanged or reduced, for hack sawing and shearing of bars and bar shapes and for hack sawing hot-rolled strip. Extras were increased for cutting certain plates but no changes have been made as yet for cutting sheets or structurals.

Mill receipts generally have shown no improvement in the second quarter over the first and in some instances, where trucking out of the Pittsburgh area is a factor, they have declined. A few warehouses report a slight increase in shipments over their quotas due to mill distribution of tonnages which were canceled by original buyers. This source of material is expected to expand over the remainder of the year. Warehouse stocks of all flat-rolled carbon products, plates and structurals are extremely low while those of alloys, including stainless, and cold-finished bars, have increased.

Warehouse interests here are uncertain as to the ultimate effect of the scheduled increases in lcl freight rates on steel products, other than it will mean an increase in the price of steel to consumers. It was pointed out that bulk of warehouse shipments are made by truck and that a considerable portion of the business in this territory is done on an fob shipping point basis. There may be a shift in territory served by warehouses if the freight rates are increased above the trucking rates.

Warehouse. . .

Warehouse Prices, Page 159

Pittsburgh—Distributors note a slight improvement in mill deliveries of carbon bars, structurals, tubing, and heavier gage sheets. However, moderate increase in mill product shipments to distributors falls far short of closing the gap between supply and demand. Distributors' stocks notably in plates, galvanized and light gage sheets, pipe and most merchant wire items, remain nearly depleted. Most warehouse interests are hopeful mills will clear up bulk of carryover tonnage by close of next quarter; on most items mills have promised to be on a current ordering basis by that time.

Local AFL-Teamsters strike continued

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to tie up warehouse steel shipments last week. Metalworking operations to date have not been seriously affected by the truck strike, but if it continues curtailment in production schedules is inevitable. Steel consumers outside this district have been given a temporary "break" because of the truck strike, with distributors shipping badly needed steel via rail.

Cincinnati — Demand for steel from warehouses is steady with no indication so far of a seasonal letup in ordering, especially in short items, in the next two months. Mill deliveries are slow to improve in sheets, strip, small bars and structurals.

Chicago — Although warehouses continue to operate under the handicap of depleted inventories, there is evidence that stocks of some products are improving slightly. This does not include flat-rolled steel, however, which is being distributed to customers as rapidly as it is received. Metal fabricators are trying desperately to obtain from warehouses certain items which are in short inventory and which are restricting production schedules.

Seattle—Jobbers report a steady volume of business somewhat heavier than a year ago. Inventories are low and are not increasing because in most cases materials are forwarded directly to the job. Reinforcing bars are scarce, as mills are unable to meet demand. Galvanized sheets continue the most critical item, no relief being in sight. Nails also are scarce. Heavy hot-rolled items are easing and stainless steel items are arriving in larger volume.

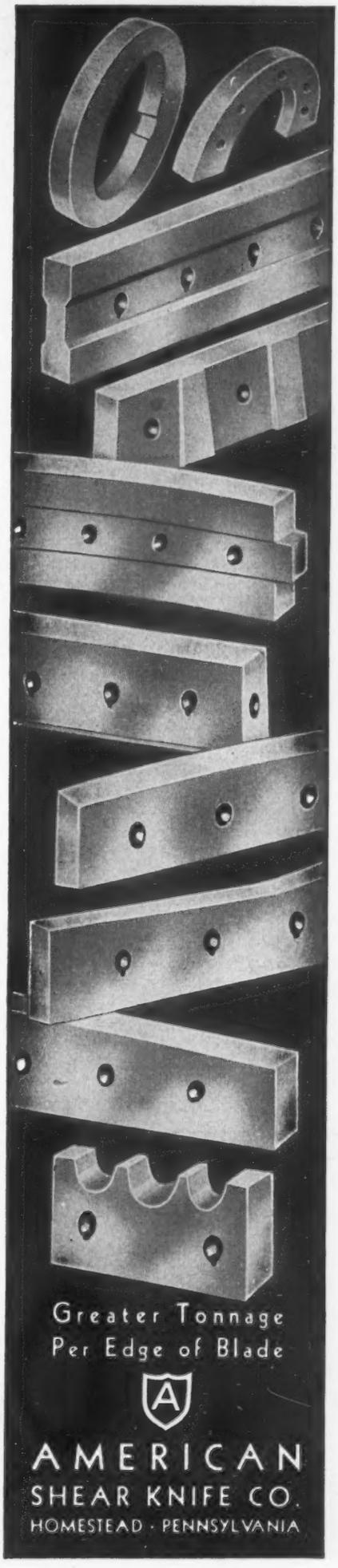
Philadelphia — District jobbers are planning to bring out new price schedules shortly as a result of the increase in lcl freight rates which are effective June 20 on iron and steel products. Under the recent change, lcl shipments of these products were taken from class 40 and put in class 4 with a resulting increase of 25 per cent. The increase in the price of the general run of warehouse products however, will not reflect this full advance in lcl rates, it is understood. June will wind up as another good month for local jobbers, some stating that so far they are actually ahead of May in both price and tonnage volume. Except for sheets, small shapes and plates, incoming tonnage from mills has been somewhat better.

Canada . . .

Toronto, Ont. — Iron and steel ingot production in Canada declined 3 per cent in April from the preceding month. Pig iron output for April amounted to 160,749 net tons, or 71.2 per cent of capacity, against 164,403 tons, or 70.5 per cent in March, and compares with 142,240 tons in April, 1946. Output for April included 128,233 tons of basic iron, 18,823 tons of foundry iron, and 13,064 tons of malleable iron.

Production of ferroalloys in April amounted to 13,015 net tons against 13,083 tons for the corresponding month last year. Output for the month included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus.

Steel ingots and castings produced in April amounted to 252,156 tons, or 86.5 per cent of capacity, and compares with 269,732 tons in March, or 89.5 per cent, and with 247,519 tons for April of last year. Output included 244,998 tons of



steel ingots and castings and 7158 tons of steel castings.

Following are comparative production totals in net tons:

	Steel Ingots, Castings	Pig Iron	Ferro-alloys
Apr, 1947	252,156	160,749	13,015
Mar, 1947	269,732	164,403	14,197
Apr, 1946	247,519	142,240	13,083
4 mos, 1947	1,000,908	653,097	46,213
4 mos, 1946	975,152	587,032	43,238
4 mos, 1945	1,070,860	627,343	60,316

Component Inventories and Shipments Are Unbalanced

(*Concluded from Page 71*)

tainerd within 60 days by 60 per cent of buyers.

Weldments are in the best delivery position of any component included in the survey and almost 94 per cent of users can get deliveries within 60 days. As a result of this easy delivery situation, most companies are carrying low stocks.

Deliveries of springs and wire shapes have improved moderately but scarcity of spring wire still is bothersome.

Bearings continue a tight item, although slightly easier than last September. One-third of the companies now can obtain delivery within 60 days, while about 55 per cent must wait from two to six months. Inventories are little changed, with about half of the users having stocks for two months' operations.

Belting and belt drives are in relatively good supply, and nearly three-fourths of users can obtain delivery within 60 days.

Coupling shipments have improved and 60 per cent of users now are obtaining them within 60 days of ordering. Inventories have been reduced since last September and only about 30 per cent are carrying a two-month stock.

Deliveries of gears and gear drives are better than last fall, with twice as many users now able to get deliveries within 60 days.

Comments by the metalworking executives questioned indicate that one of the primary causes for delay in delivery of components is the inability of the partsmakers to obtain raw materials, particularly flat-rolled steel and pig iron. Some companies are supplying steel to their suppliers to speed parts delivery.

A large number of companies call attention to wide variations in both inventories and deliveries, often in the same category. One manufacturer for instance, reports stocks of forgings range from none to 18 months and that deliveries quoted by one supplier are six weeks and from another supplier 20 weeks.

Deliveries from suppliers have been so uncertain in many cases that manufacturers have found it almost impossible to achieve reasonable balance in their inventories. Some suppliers are far behind on deliveries and others are shipping ahead of schedule.

Many more companies expressed concern over the problem of balancing components inventories than was noted in STEEL's study last September. They are becoming more wary of overstocking.

Typical comments reflecting this situation: "There seems to be a general easing up on deliveries so we are now reducing our inventory by short term purchases."

"We are scheduling our material so incoming items turn over within 30 days."

"All items are easier to get and our problem is becoming one of balancing inventory and keeping suppliers from shipping ahead of schedule rather than the recent problem of getting deliveries."

Tool Steel Price Tone Stiffens As Tungsten Ore Market Advances

New York — With tungsten ore prices undergoing further advances, now holding around $31 to $32 per short ton unit, duty paid, tool steel prices are showing considerable strength. Carboloy Co., Detroit, is reported to have increased its prices 10 per cent effective June 20 and certain other large producers are expected to increase their tungsten steels in the near future. One leading interest, which advanced quotations around Apr. 1, may step up prices again by July 1.

Strength of the tungsten ore market has tended to put somewhat of a damper on the purchase of the 18-4-1 tool steels. During the war 6-6-2 steels were in considerable use as a substitute for the higher tungsten steels but following the end of hostilities there was a gradual trend once more toward greater utilization of the latter type steels, only to be checked recently.

Only small amount of tungsten ore is coming in from China, which prior to the war was the major source of supply for this country. Much of the Chinese material is now going to Russia. South American tungsten has been in greater demand by Europe over past months and this has also had a stimulating effect upon the tungsten ore market in the United States.

However, as tungsten prices have increased, there has been a quickening in domestic production, which dropped off sharply at the end of the war. The Riley mine in Nevada, one of the larger units, is now getting into operation and the Pine Creek, Calif., property, a still larger unit, is scheduled to go into production in July. Both of these properties are owned by the United States Vanadium Corp. It is difficult to estimate how much tungsten ore can be produced at these properties for a while, particularly in view of the labor shortages in those areas; however, the amount should prove to be fairly substantial.

Higher prices for ore are also expected to bring in an increasing number of small units over the next several months. This may check the uptrend of the market. Some offerings have been made as high as $36, duty paid, but no sales have been reported at this figure. Nevertheless, the trend is still strong and higher than current levels may develop shortly.

Tungsten alloy prices have shown no change in the past several weeks and insofar as contracts are concerned, at least one leading ferroalloy seller sees no change ahead for at least another several weeks, although spot prices may conceivably change within that time.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

700 tons, field house, Omaha, Nebr., to Omaha Steel Works, Omaha, Nebr.

300 tons plus, Monsanto Chemical Co. plant, Seattle, to Pacific Car & Foundry Co., Seattle.

180 tons, St. Anthony's club, Philadelphia, to Belmont Iron Works, Eddystone, Pa.

170 tons, plant extension, Oliver United Filter Co., Hazelton, Pa., to Standard Equipment Co., Harrisburg, Pa.

150 tons, sheet piling, power house, Bellevue, Nebr., to Inland Steel Co., Chicago; Bates & Rogers Construction Corp., Chicago, contractor.

140 tons, bridge, Peoria, Iowa, for state, to Pittsburgh-Des Moines Steel Co., Pittsburgh; Brogan Construction Co., contractor. Reported last week erroneously as Peoria, Ill.

140 tons, addition, Stegmaier brewery, Wilkesbarre, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

STRUCTURAL STEEL PENDING

3620 tons, steel sheet piling for McNary dam, Oregon; bids in to U. S. engineer, Portland, Oreg.

1745 tons, Missouri river bridge, Decatur, Nebr., for Burt County Bridge Commission; Industrial Contracting Co., Minneapolis, low on general contract; bids June 16.

1100 tons, Northport state bridge, Washington; Midland Structural Steel Co., low, $518,500.

800 tons, E. 83rd St., subway substructure and superstructure, Department of Public Works, Chicago; Ready Coal & Construction Co., Chicago, low on general contract; bids June 17.

750 tons, building, Solvay Process Co., North Baton Rouge, La.

500 tons, city garage, St. Louis.

400 tons, bridge Cont. 2812, Ft. Wayne, Ind., for State Highway Commission; bids of June 3 rejected.

325 tons, three grade structures, including Royal river bridge, Yarmouth, Cumberland county, Me.; bids June 25, state highway commission, Augusta.

220 tons, bridge Cont. 2814, Cutler, Ind., for State Highway Commission; R. L. Schutt, Indianapolis, low on general contract; bids June 3.

206 tons, bridge Cont. 2813, Rockville, Ind., for State Highway Commission; R. L. Schutt, Indianapolis, low on general contract; bids June 3.

200 tons, third unit Ross dam, city of Seattle; contract in negotiation.

200 tons, University of Washington library addition, Seattle; Sound Construction & Engineering Co., Seattle, low, $322,700.

180 tons, City Line shopping center, Philadelphia.

180 tons, furniture warehouse, Hardwick & MacGee, Philadelphia.

150 tons, Bonneville Administration substation; Bethlehem Pacific Coast Steel Co., low, $40,544.

100 tons plus, Washington state Washougal bridge; Don L. Garney, general contractor, awarded $80,286.

100 tons, bridge, route 25, Cranbury Circle to Hightstown, N. J., Middlesex-Mercer counties, New Jersey; bids July 2, Spencer Miller Jr., state highway commissioner, Trenton.

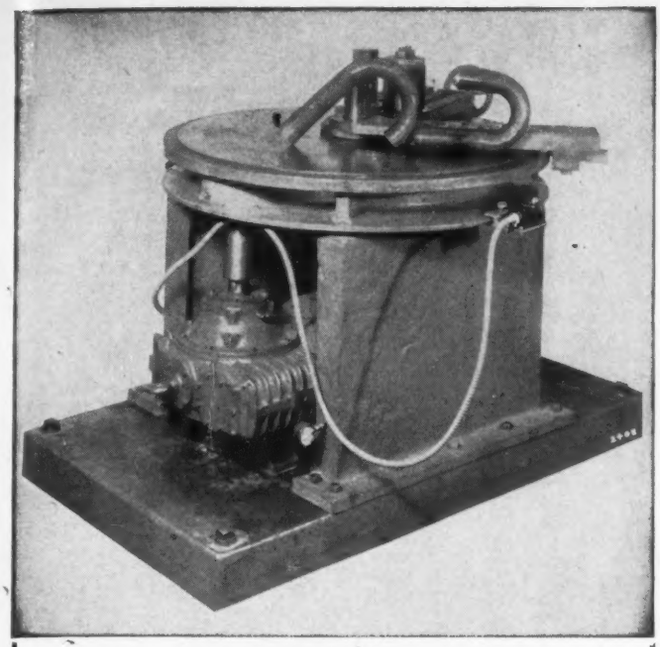
100 tons, shapes and bars, Army dredge; general contract to Sun Shipbuilding & Dry Dock Co., Chester, Pa.

100 tons, factory building, Atlantic Refining Co., Philadelphia.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2000 tons, siphons and other items, Columbia



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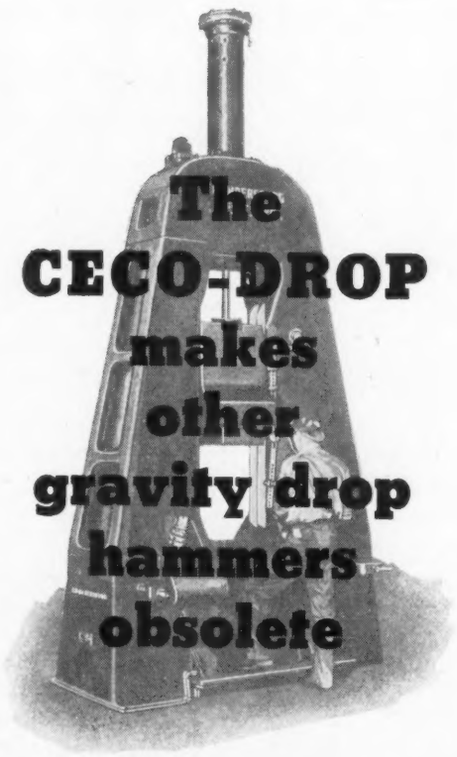

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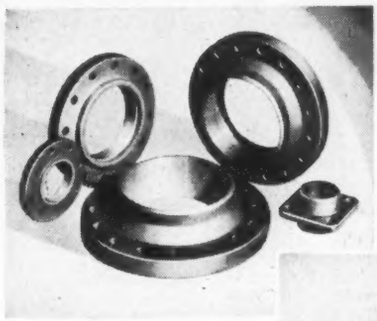
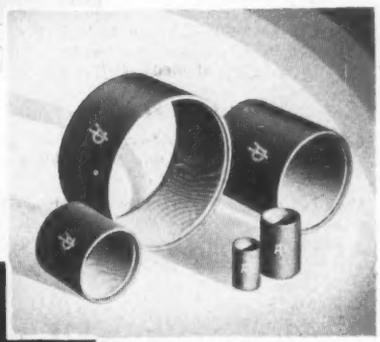
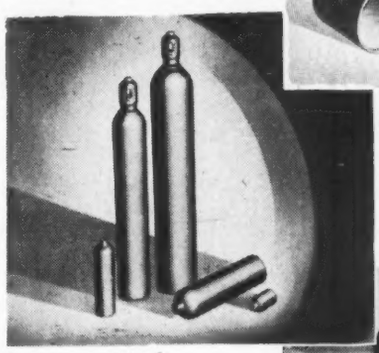


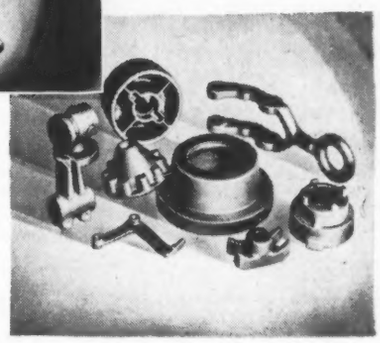
Harrisburg Drop-Forged Steel Pipe Flanges are made to A.S.A. standards and can be furnished in standard or special types to meet your exact requirements.



Harrisburg Seamless Steel Pipe Couplings are manufactured to A.P.I. specifications and are available in all sizes.



Harrisburg Seamless Steel Cylinders for high pressure gases. Available in standard or lightweight.



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basin project, to Bethlehem Pacific Coast Steel Co., Seattle.

1000 tons, tractor building LL, Caterpillar Tractor Co., East Peoria, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, power plant extension, Central Illinois Electric & Gas Co., Rockford, Ill., to Carnegie-Illinois Steel Corp., Chicago; Stone & Webster Engineering Corp., Boston, engineers.

REINFORCING BARS PENDING

600 tons, Army air base, Rapid City, S. D.; Steenberg Construction Co., St. Paul, low on general contract; bids June 9.

435 tons, highway project, route 25, section 25C and 22D, Cranbury Circle to Hightstown, Middlesex-Mercer counties, New Jersey; bids July 2, Spencer Miller Jr., state highway commissioner, Trenton.

200 tons, rotogravure plant, R. R. Donnelley-Crawfordsville Co. Inc., Chicago; revised bids June 20.

190 tons, Powers building, Chicago, for Walter P. Powers; bids June 16.

Unstated, lake water pump house, Cities Service Oil Co., East Chicago, Ind.; bids June 30.

Unstated, relift pumping plants, Pasco project; James Construction Co., Seattle, sole bidder, $68,016.

Unstated, 300,000-gallon, concrete reservoir for Port of Seattle; bids June 18.

PLATES . . .

PLATES PLACED

Unstated, 96-inch plate-steel pipe, 456 feet long and structural steel supports and anchor bolts, for Willow Creek siphon, Bureau of Reclamation, Denver, to Pacific Coast Engineering Co., Alameda, Calif.; low $72,736.

PLATES PENDING

6500 tons, seagoing dredge, Army; general contract awarded to Sun Shipbuilding & Dry Dock Co., Chester, Pa.

Unstated tonnage, 250,000-gallon elevated steel water tank, naval supply depot, Scotia, N. Y., Pittsburgh-Des Moines Steel Co., Pittsburgh, low; bids June 4, spec. 18499.

PIPE . . .

CAST IRON PIPE PENDING

250 tons, various sizes, system improvement, Oroville, Wash; bids in.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atcheson, Topeka & Santa Fe, 250 seventy-ton drop end gondolas and 125 seventy-ton hoppers, to American Car & Foundry Co., New York.

Baltimore & Ohio, 25 seventy-ton flat cars, to own shops at Keyser, W. Va.

Chicago & Eastern Illinois, 200 fifty-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago, these being in addition to 300 placed with the same builder early in the year.

Illinois Terminal, nine, 1000-horsepower diesel-electric locomotives, to American Car & Foundry Co., New York.

Louisville & Nashville, 3000 hoppers divided equally between Pullman-Standard Car Mfg. Co., Chicago, and Bethlehem Steel Co., Bethlehem, Pa. Previously, 1500 of these cars were incorrectly reported in the June 9 issue as going to another car builder instead of to Bethlehem.

Union Pacific, 400 seventy-ton hoppers, to General American Transportation Corp.

RAILROAD CARS PENDING

Baltimore & Ohio, 2000 seventy-ton hoppers and 1000 fifty-ton hoppers.

Chicago, Milwaukee, St. Paul & Pacific, 1000 fifty-ton hoppers and 250 seventy-ton covered hoppers.

Illinois Central, 1500 fifty-ton hoppers.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BAKERSFIELD, CALIF.—National Supply Co. has received OHE approval for construction of a $74,000 office and warehouse building on Chester Ave.

LOS ANGELES—MacCallum Steel Corp. has been formed by Telford MacCallum with capital of $200,000. Firm is represented by Reay, Sharf & Reay, 1411 Chapman Bldg.

LOS ANGELES—Western Electric Co., 800 McGarry St., has received OHE approval for a $631,000 project to include four industrial buildings at Denker and Slauson Aves. Project was designed by Austin Co.

SAN FRANCISCO—Pacific International Pipe & Steel Co. has been incorporated by J. L. Hanna and associates, 2300 Ralston Ave., Burlingame, with capital of $100,000.

TORRANCE, CALIF.—General Petroleum Corp. has received OHE approval for construction of a building at W. 119th St. Contract at $100,000 has been awarded to P. J. Walker & Co., 3900 Whiteside Ave., Los Angeles. To contain 5000 sq ft of floor space, building was designed by Albert C. Martin & Associates.

CONNECTICUT

NEW LONDON, CONN.—A. S. Hollandersky, 325 State St., has let a $55,000 contract to J. D. McWilliams Co., Falls Ave., Norwich, for enlarging a boiler plant.

WATERBURY, CONN.—Chromium Corp. of America, Huntington Ave., has awarded a $55,000 contract to Oscar Stroberg & Sons, 1003 Watertown Ave., for a 1-story factory addition on E. Aurora St.

DELAWARE

WILMINGTON, DEL.—Atlas Powder Co., Delaware Trust Bldg, 9th and Market Sts., has awarded a $1,600,000 contract to Foley Bros. Inc., Pleasantville, N. Y., for an industrial chemical plant.

ILLINOIS

CHICAGO—Carborundum Co., 3630 S. Iron St., will soon let a $180,000 contract for a 2-story addition to its plant. Engineers are A. Epstein & Sons, 2011 W. Pershing Rd.

INDIANA

INDIANAPOLIS—American Foundry Co. will build a $2 million foundry as an addition to its plant at 1535 Naomi St.

MICHIGAN

DETROIT—Western Refrigeration & Equipment Co. Inc., 2756 Woodward Ave., has been formed by Jack Pearlman with capital of $100,000 to manufacture and sell refrigerators.

EAST DETROIT, MICH.—Major Mold & Die Corp., 20955 Schoenherr Rd., has been formed by Loren T. Raymond with capital of $100,000 to manufacture plastic molds, jigs and dies.

GRAND RAPIDS, MICH.—National Brass Co. has awarded a $72,000 contract to Osterink Construction Co. for a factory.

MINNESOTA

HOPKINS, MINN.—Minneapolis Moline Power Implement Co., 2854 Minnehaha Ave., Minneapolis, has awarded a $180,000 contract to E. M. Ganley, 2922 Oakland Ave., Minneapolis, for a 1-story warehouse addition and a 2-story engine room.

NEBRASKA

OMAHA, NEB.—Burlington Transportation Co., 701 N. 20th St., has awarded a $75,000 contract to James Leck Co., 211 S. 11th St., Minneapolis, for a motor rebuilding shop.

NEW JERSEY

TRENTON, N. J.—J. A. Roebling Sons Co., 640 S. Broad St., has awarded separate contracts totaling $330,000 for a wire manufacturing factory.

NEW YORK

WALTON, N. Y.—Julius Kayser & Co., will build a $100,000 factory here. Architect is Clarence Higginson, 101 Park Ave., New York.

OHIO

AKRON—Lehr Iron & Steel Inc. has been incorporated by Andrew R. Neidert, 665 W. Wilbeth Rd. The company was authorized to issue 3000 shares of no par value stock.

BARBERTON, O.—Columbia Chemical Co., Columbia St., plans construction of a $50,000 plant addition.

CINCINNATI—Cincinnati Gas & Electric Co. has received OHE approval to enlarge its Columbia Park power station. Total cost of the project, including equipment, will be over $10 million.

RHODE ISLAND

PROVIDENCE, R. I.—Congdon & Carpenter Co. has awarded a contract to Gilbane Building Co. Inc. for erection of an addition to its present factory building at 405 Promenade St.

PROVIDENCE, R. I.—Kestennan Bros. Mfg. Co., 150 Chestnut St., has awarded a $100,000 contract to Dimeo Construction Co., 75 Westminster St., for a 1-story, 99 x 200 ft factory.

TEXAS

DALLAS, TEX.—Nash-Kelvinator Corp., 2109 Live Oak St., has plans in progress by Bertram C. Hill, 4703 Ross Ave., for construction of auto parts storage building at Denton and Mockingbird Lane.

DALLAS, TEX.—Regina Mfg. Co., 939 S. Lamar St., has postponed indefinitely its $140,000 factory project.

HOUSTON, TEX. — Atlas Engineering Co., 5206 Navigation Blvd., has awarded a $55,000 contract to Metallic Building Co., 224 Main St., for a plant.

HOUSTON, TEX.—Ceco Steel Products Corp. will build a 210 x 300 fabricating building at Weber and Silver Sts. It will cost approximately $100,500.

HOUSTON, TEX.—Western Electric Co. Inc. has awarded a $987,000 contract to Austin Co., Second National Bank Bldg., for construction of office, warehouse, storage dock, assembly room and a garage at Lockwood Dr. and Crite St.

SWEENY, TEX.—Alamo Refinery Co. & Associates plan to make $250,000 worth of improvements in a gasoline refinery plant here.

TYLER, TEX.—Thompson Stove Co. has awarded a $55,000 contract to Collins & Sharp for a factory addition.

WASHINGTON

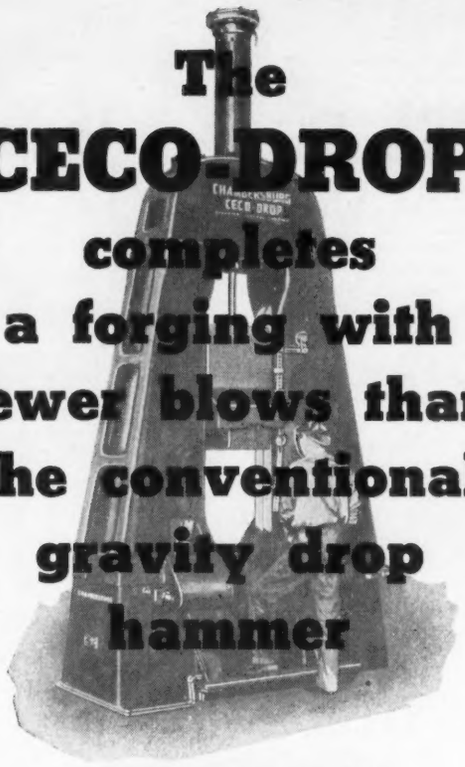
SEATTLE—Pacific Metal Co., 704 Third Ave., has awarded a $100,000 contract to Howard S. Wright & Co. Inc., 407 Yale Ave. N., for a 1-story warehouse. Architect is J. L. Skoog, 8210 14th Ave., N. E.

SEATTLE—Western Tractor & Equipment Co. plans to build an $80,000 concrete warehouse, 184 x 95 ft, at 5515 Eighth Ave. S.

WISCONSIN

MILWAUKEE—Chain Belt Co., 1600 W. Bruce St., will build a $140,000 boiler house. Architects are Eschweiler & Eschweiler, 720 E. Mason St.

The CECO-DROP completes a forging with fewer blows than the conventional gravity drop hammer



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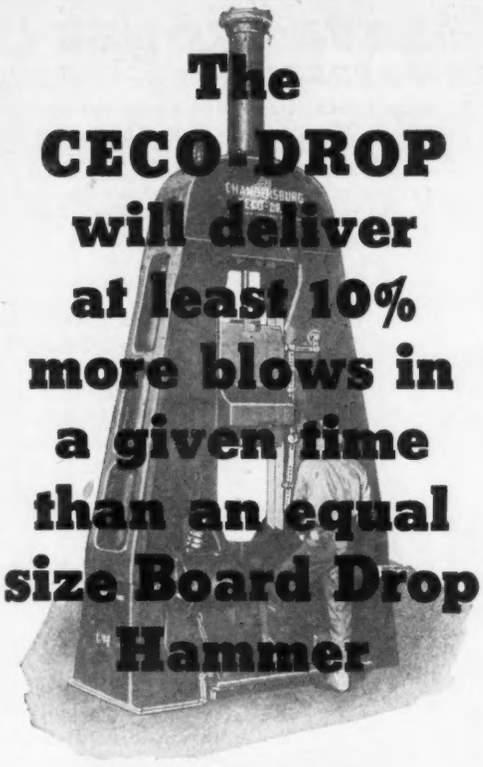

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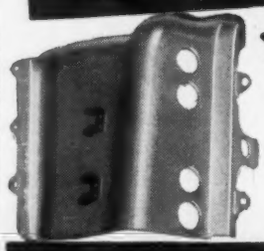

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.085	1200	.250	1000
.115	12000	.2656	100
.120	4000	.281	120
.142	300	.3125	4000
.143	300	.303	9000
.1562	2000	.323	1200
.168	900	.358	250
.180	900	.375	38000
.182	2500	.404	100
.1875	250	.4218	5000

	Lbs.
⅛ x 1¼ Flat	150
.250 Sq.	7000

Crucible Sanderson
Special—3 ft. lengths

Size	Lbs.	Size	Lbs.
.080	175	.219	20
.072	5	.227	50
.077	5	.250	8000
.115	150	.272	10
.120	150	.277	25
.125	50	.2812	4500
.1562	2500	.290	250
.168	10	.302	275
.175	5	.3125	7500
.180	5	.3437	10
.182	25	.348	5000
.197	10	.375	16000
.199	15	.500	300
.204	30	.5625	250
.2187	100	.625	150
		.6875	6000

	Lbs.
Sq. .0625	40
.125	100
.3125	250
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222 " 10" Jr. Beams 9# 20'
62 " 12" Jr. Beams 11.8# 40'
50 " 12" Jr. Beams 11.8# 30'
140 " 12" Jr. Beams 11.8# 60'
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Wanted

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Metal Specialties comprised of STAMPINGS, FORMING, WELDING, SPINNING, MACHINING. All Metal or Combined with Non-Metal Materials

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OR PARTS AND DEVELOPMENT ONLY

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As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

SPEEDAIRE delivers, rain or shine

OPERATING outdoors in all kinds of weather, protected only by a piece of sheet iron, this Speedaire drives a reciprocating feeder that empties slate from the storage bin above it into dump cars.

Three compelling reasons led the Coal Company to install Speedaire instead of a conventional worm gear reducer: Speedaire weighed 30% less—it required 26% less headroom—it saved $50.50.

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

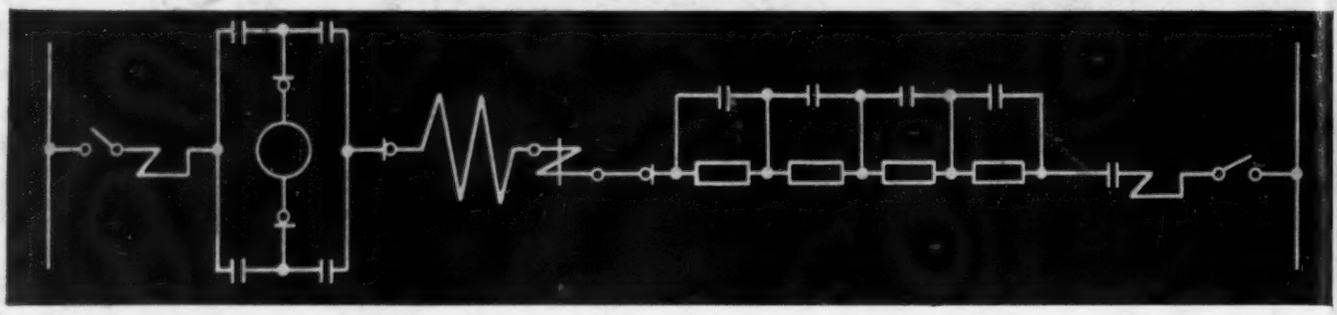
For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3270 E. 80th St., Cleveland 4, O.

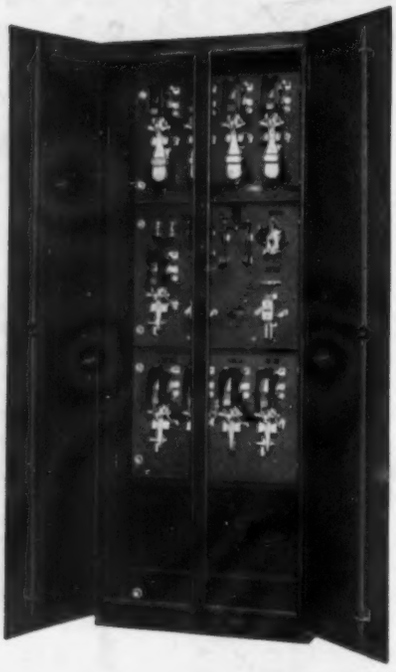
Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

What control for what mill equipment? One of a SERIES of advertisements featuring basic heavy duty power circuits . . . and showing Cutler-Hammer's broad design and application experience which has made it the preferred control for the steel industry.

When you have a crane application that calls for accurate stopping of bridge and trolley . .





CHECK these mechanical components as well

Then ask for Cutler-Hammer No. 14111

D. C. Reversing Plugging Control

with Rectifier Plugging

Cutler-Hammer engineers have designed this simple, rugged mill control for series wound motors that drive crane bridge and trolley or other equipment that must be stopped and reversed frequently, rapidly and accurately.

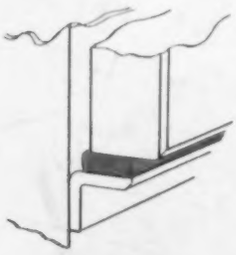
Besides using the well-known C-H *Ltl* Inductive Time Limit acceleration, this control employs rectifier plugging for fast, accurate stops. The master inherently provides several operating speeds with speed reduction up to 50%. An optional, low creeping speed can also be supplied.

Mill maintenance men like Bulletin 14111 because of its ruggedness and simplicity of design. They also like the mechanical features, a few of which are shown below.

Dependable 14111 is the product of long years of diversified Mill Control experience. . . . . CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

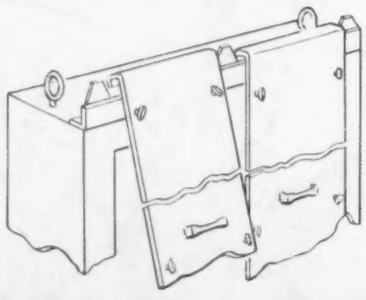
CUTLER-HAMMER
MOTOR CONTROL
C-H

Shock-proof frame



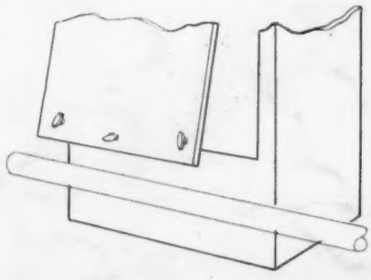
An important detail is the C-H Shock-Proof Frame. Here, special angles, welded to the frame support each Unit Panel on a resilient mounting base.

Easy-on, easy-fasten back plate



Back plate hooks on at top and is self-aligning. With this and captive wing nuts, maintenance men find it easy to remove.

Shaft-clearing short back plate



Another feature mill men like is the C-H short back plate that clears the crane bridge drive shaft.